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WATER QUALITY OF INTERSTATE STREAMS IN THE SUSQUEHANNA RIVER BASIN MONITORING REPORT FOR 1986 AND 1987 WATER YEARS

SUSQUEHANNA RIVER BASIN COMMISSION

RESOURCE QUALITY MANAGEMENT & PROTECTION DIVISION

JUNE 1988

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WATER QUALITY OF INTERSTATE STREAMS IN THE SUSQUEHANNA RIVER BASIN

MONITORING REPORT FOR 1986 AND 1987 WATER YEARS

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ABSTRACT

A water quality monitoring network consisting of fourteen stations on interstate streams in the Susquehanna River Basin was sampled monthly for chemical and bacteriological parameters between April 1986 and September 1987. Chemical quality was also determined from macroinvertebrate samples collected at these same sites during summer low flow periods. The monitoring program contributes to a database that is used to assess impacts on water quality standards, characterize ambient and seasonal stream quality, and assess trends.

There were few observations of parameter values excceding water quality standards. Fecal coliform was the most widespread pollutant. High concentrations were observed intermittantly at almost every station, with the Susquehanna River at Sayre, Pennsylvania, the Chemung River, Conowingo Creek, Octoraro Creek and Deer Creek having persistent problems. High turbidities in the Chemung River, Octoraro Creek and Conowingo Creek were all associated with storm events.

INTRODUCTION

The Susquehanna River Basin Commission (SRBC) is responsible for reviewing projects and policies having potential impacts on interstate water resources in the Susquehanna River Basin. Current water quality data are required to accomplish this task. Existing monitoring programs conducted by Maryland, Pennsylvania and New York provide data for streams within their boundaries but do not generally cover interstate streams. In addition, these programs differ in the frequency of data collection and the parameters of interest. A monitoring program was established to provide SRBC staff with comparable data necessary to assess impacts on the water quality of interstate streams.

The monitoring program included monthly collections of water quality samples and annual collections of benthic macroinvertebrate samples at fourteen stations on ten interstate streams. The data are used for project review procedures to evaluate water quality impacts due to new or changing projects or policies. These data are used to to assess the perservation of water quality standards; to provide for the characterization of stream quality and seasonal variations; and to build a database for the future assessment of water quality trends.

Other interstate streams were sampled intermittantly. These stream generally drain small rural watersheds. Little or no data is available for these streams and water quality is assumed to be

good. Water quality in these streams will be documented by this program, thus allowing for better management of this resource.

This report covers the period from April 1986 to September 1987.

BASIN GEOGRAPHY

The Susquehanna River Basin is the largest river basin in the Atlantic Ocean drainage area of the United States, with an area of 27,580 square miles (Figure 1). The Susquehanna River originates at the outlet of Otsego Lake at Cooperstown, New York and flows for 450 miles through New York, Pennsylvania and Maryland to the Chesapeake Bay at Havre de Grace, Maryland. Twenty-eight perennial streams cross the New York - Pennsylvania border and twelve perennial streams cross the Maryland - Pennsylvania border (Table 1 and Figures 2 - 6).

METHODS

Streams were selected for the monitoring program based on size of drainage area or known or suspected water quality problems. Many of the larger streams are used for recreation (fishing, swimming and boating) and water supply. These streams also receive waste water effluents which impact water quality. Streams with known or suspected water quality problems were monitored to document degraded conditions. The specific

TABLE 1

INTERSTATE STREAMS IN THE SUSQUEHANNA RIVER BASIN

Between New York and Pennsylvania

Apalachin Creek
Bentley Creek
Bill Hess Creek
Briggs Hollow Run
Bulkley Brook
Camp Brook
Cascade Creek
Cayuta Creek
Chemung River
Choconut Creek
Cowanesque River
Denton Creek
Holden Creek
Little Snake Creek
North Fork Cowanesque River
Little Wappasening Creek
Parks Creek
Russell Run
Sackett Creek
Seeley Creek
Snake Creek
South Creek
Susquehanna River
Tioga River
Troups Creek
Trowbridge Creek
Wappasening Creek
White Branch Cowanesque River

Between Pennsylvania and Maryland

Big Branch Deer Creek
Broad Creek
Conowingo Creek
Deer Creek
Ebaughs Creek
Falling Branch Deer Creek
Long Arm Creek
Muddy Creek
Octoraro Creek
Scott Creek
South Branch Conewago Creek
Susquehanna River

FIGURE 1 - SUSQUEHANNA RIVER BASIN

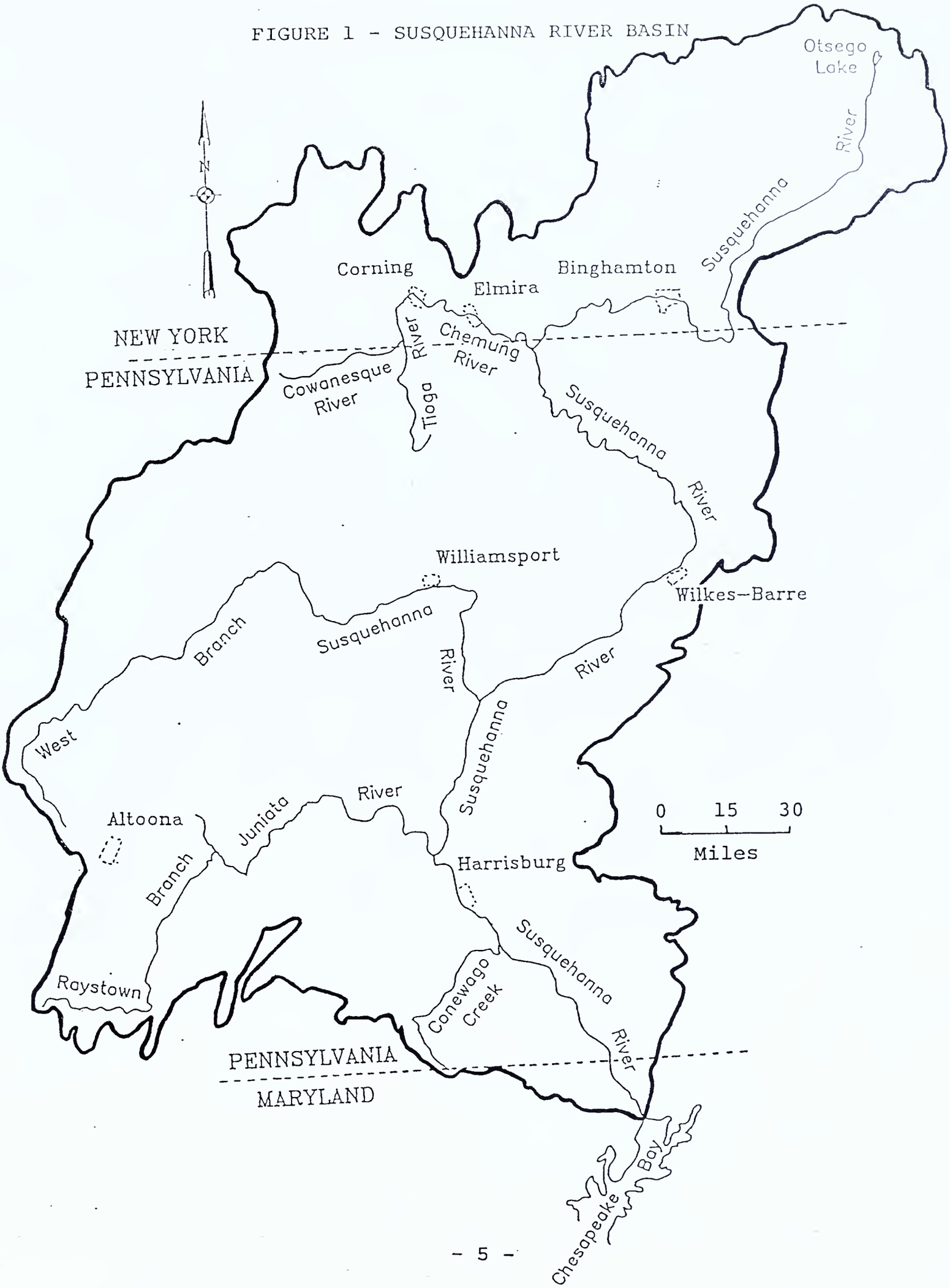

FIGURE 2 - INTERSTATE STREAMS BETWEEN NEW YORK AND PENNSYLVANIA

NEAR THE COWANESQUE RIVER

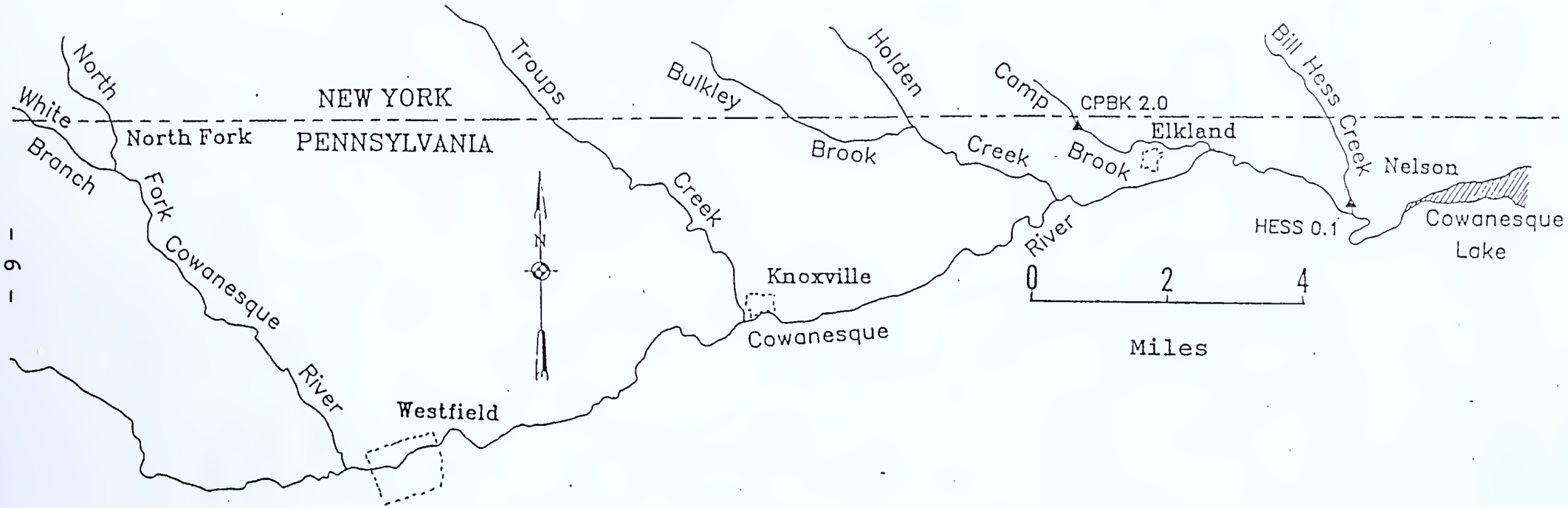

FIGURE 3 - INTERSTATE STREAMS BETWEEN NEW YORK AND PENNSYLVANIA

NEAR THE CHEMUNG RIVER

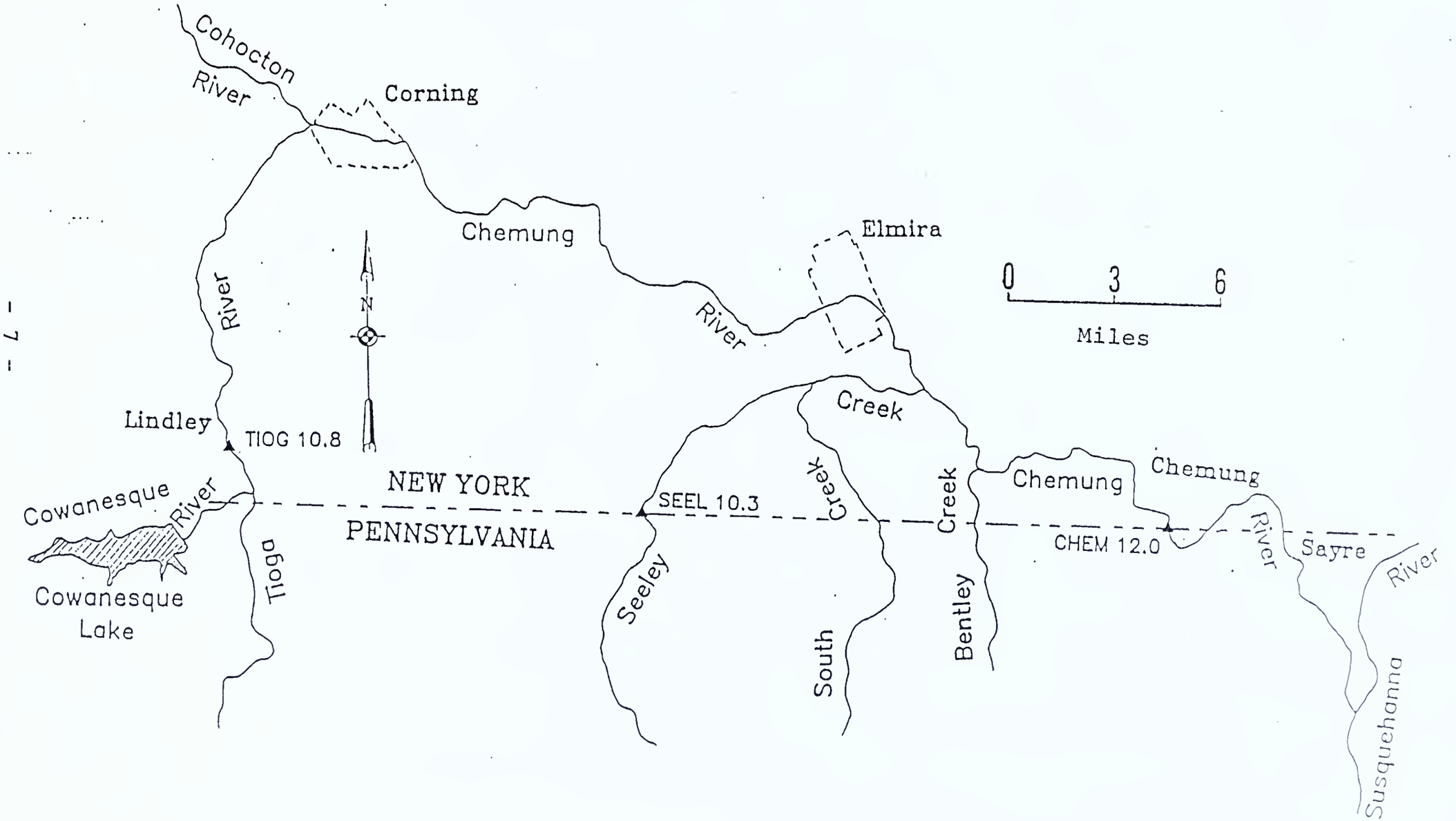

FIGURE 4 - INTERSTATE STREAMS BETWEEN NEW YORK AND PENNSYLVANIA

NEAR THE SUSQUEHANNA RIVER

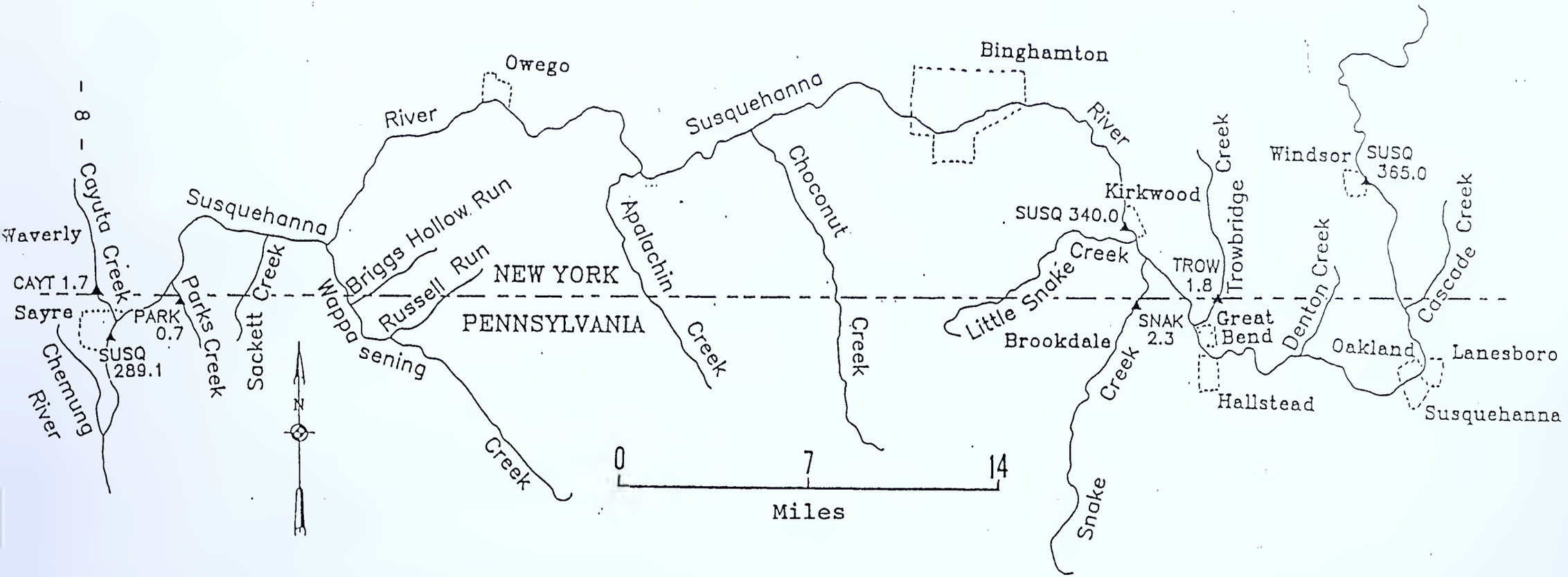

FIGURE 5 - INTERSTATE STREAMS BETWEEN MARYLAND AND PENNSYLVANIA

BETWEEN MARYLAND AND PENNSYLVANIA

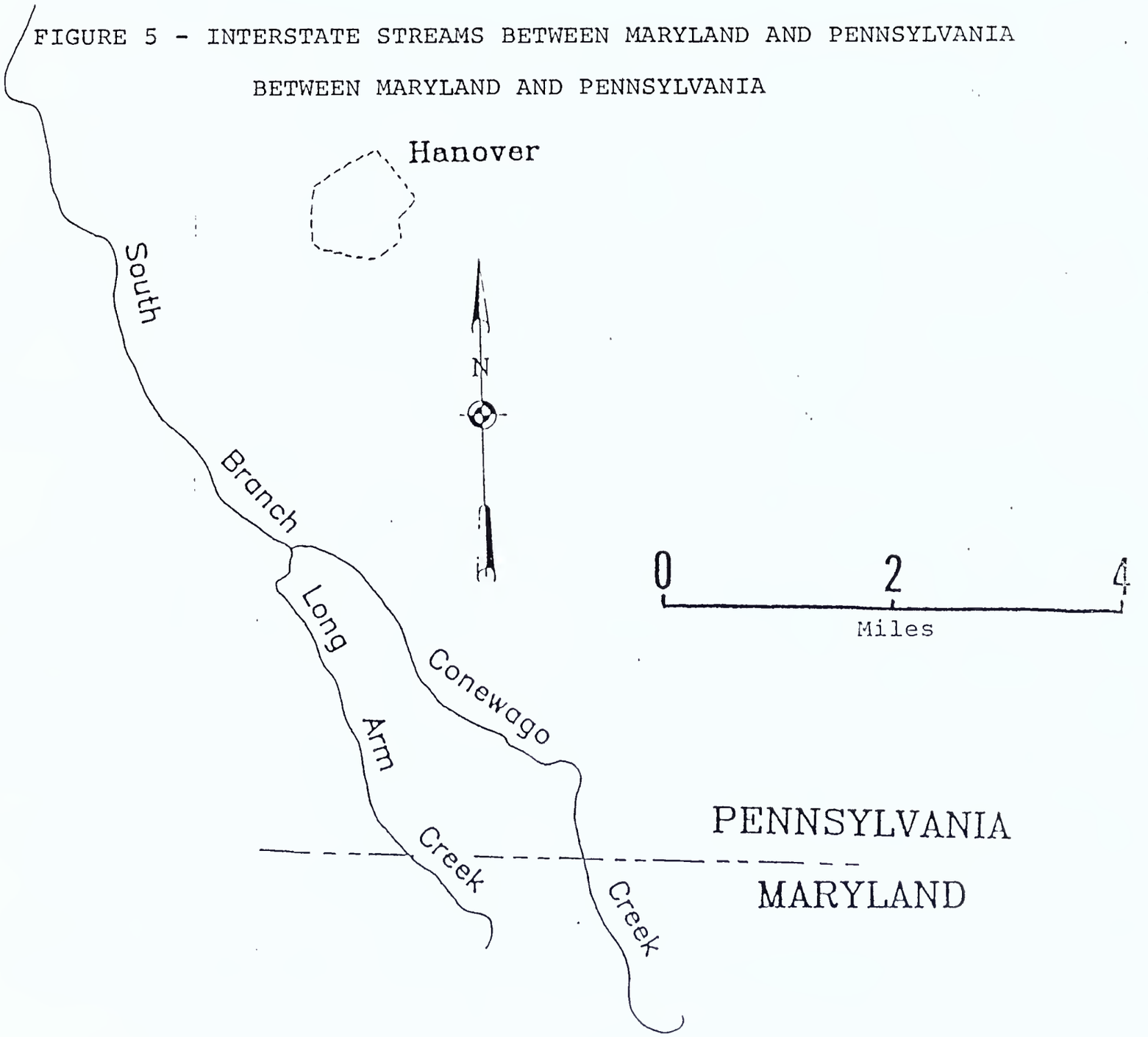

FIGURE 6 - INTERSTATE STREAMS BETWEEN MARYLAND AND PENNSYLVANIA

NEAR THE SUSQUEHANNA RIVER

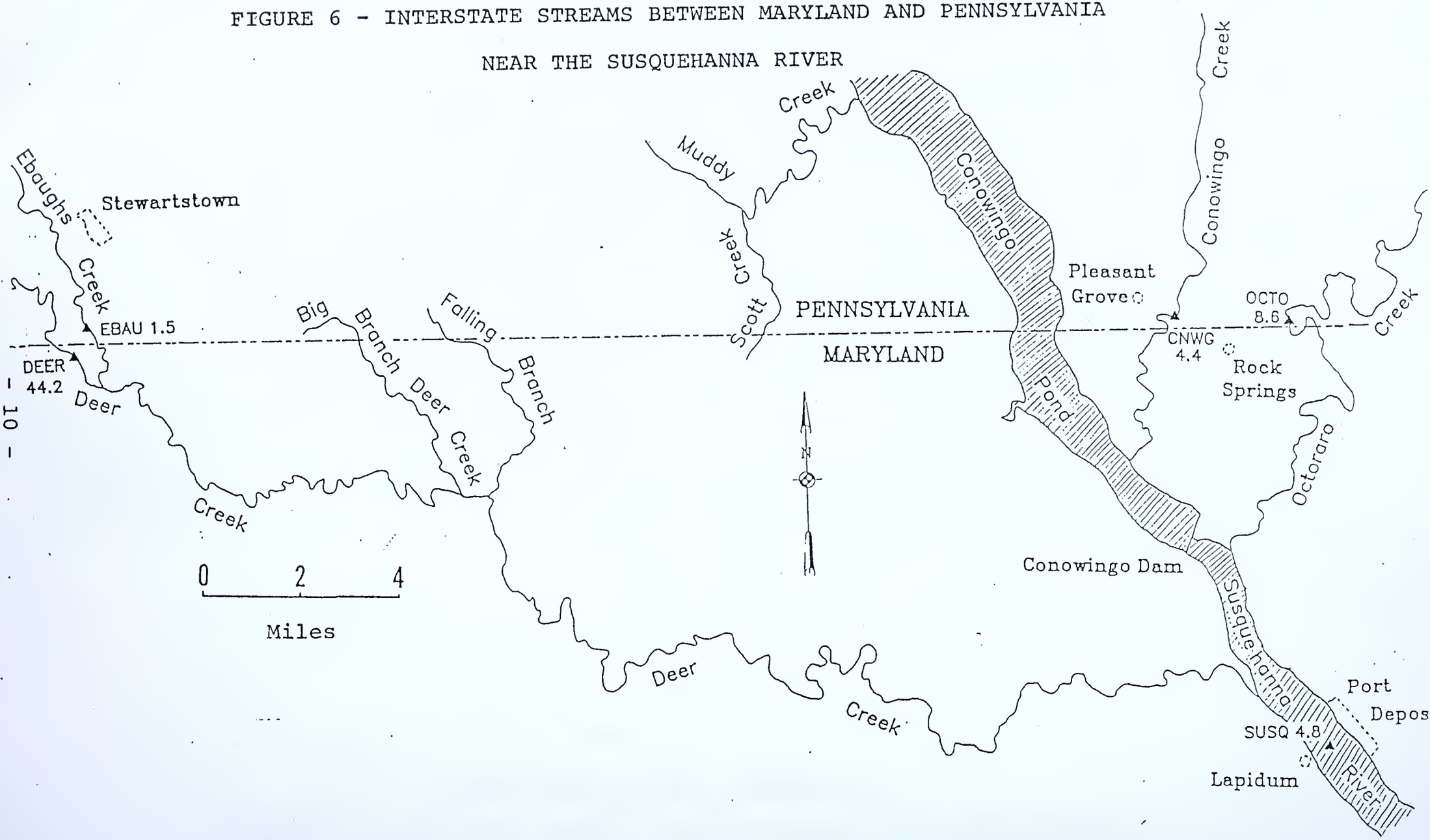

TABLE 2

INTERSTATE WATER QUALITY MONITORING NETWORK STATIONS

Station	Stream	Location	County	State	Lat/Long
SUSQ 365.0	Susquehanna River	Windsor	Broome	New York	42.04.28/75.38.14
SUSQ 340.0	Susquehanna River	Kirkwood	Broome	New York	41.57.58/75.44.33
SUSQ 289.1	Susquehanna River	Sayre	Bradford	Pennsylvania	41.59.05/76.30.05
SNAK 2.3	Snake Creek	Brookdale	Susquehanna	Pennsylvania	41.59.37/75.47.42
CAYT 1.7	Cayuta Creek	Waverly	Tioga	New York	42.00.00/76.31.24
CHEM 12.0	Chemung River	Chemung	Chemung	New York	42.00.08/76.28.06
TIOG 10.8	Tioga River	Lindley	Steuben	New York	42.01.44/77.07.57
SEEL 10.3	Seeley Creek	State line	Bradford	Pennsylvania	42.00.03/76.54.12
SUSQ 44.5	Susquehanna River	Columbia	Lancaster	Pennsylvania	40.03.16/76.31.52
SUSQ 4.8	Susquehanna River	Lapidum/Port Deposit	Harford	Maryland	39.34.16/76.05.32
CNWG 4.4	Conowingo Creek	Pleasant Grove	Lancaster	Pennsylvania	39.43.32/76.11.08
OCTO 8.6	Octoraro Creek	Rock Springs	Cecil	Maryland	39.43.18/76.08.09
DEER 44.2	Deer Creek	West Liberty	Baltimore	Maryland	39.43.02/76.35.10
EBAU 1.5	Ebaughs Creek	Stewartstown	York	Pennsylvania	39.43.29/76.35.45
		OTHER STATIONS			
HESS 0.1	Bill Hess Creek	Nelson	Tioga	Pennsylvania	41.59.51/77.20.12
CPBK 2.0	Camp Brook	Osceola	Tioga	Pennsylvania	41.58.39/77.15.00
PARK 0.7	Parks Creek	Litchfield	Bradford	Pennsylvania	41.59.54/76.27.36
TROW 1.8	Trowbridge Creek	Kirkwood	Broome	New York	42.00.00/76.43.54

reason for selecting each station is discussed with the monitoring results. Locations of sampling stations are listed in Table 2 and shown in Figures 2, 3, 4 and 6.

STREAM DISCHARGE

Discharge data are included for United States Geological Survey (USGS) stream gages which are closest to monitoring stations. These stations include all five Susquehanna River stations plus the Chemung River at Chemung, New York and the Tioga River at Lindley, New York. All flows are mean daily discharges in cubic feet per second (cfs). No discharge measurements were made on ungaged streams.

The selected chemical, physical and bacteriological parameters are listed in Table 3. Water samples were collected using depth integrating samples. Five subsamples were collected by hand lining the samplers from bridges or by wading. The subsamples were combined in a churn splitter and churned to ensure a completely mixed sample. An unfiltered 500 ml water sample was collected for analysis of nutrients, biochemical oxygen demand, chlorides and sulfates. A second unfiltered 500 ml water sample was collected and fixed with five ml of nitric acid (HNO_3) for analysis of calcium, magnesium, iron, manganese and aluminum. A 120 ml sample was collected for bacteriological analysis for fecal coliforms and fecal streptococci. The samples were chilled on ice and delivered within 24 hours of collection to the Pennsylvania Department of Environmental Resources, Bureau of Laboratories in Harrisburg, Pennsylvania.

TABLE 3

MONITORING PARAMETERS

	STORET code
Physical	
Flow	00060
(only for stations near USGS stream gaging stations)	
Temperature	00010
Turbidity	00070
Chemical	
Field analyses	
Conductivity	00095
Dissolved Oxygen	00300
pH	00400
Alkalinity	00410
Acidity	00435
Laboratory analyses	
Biological Oxygen Demand, 5 day	00310
Total Ammonia as nitrogen	00610
Total Nitrite as nitrogen	00615
Total Nitrate as nitrogen	00620
Total Phosphorus	00665
Total Organic Carbon	00680
Total Calcium	00916
Total Magnesium	00927
Total Chloride	00940
Total Sulfate	00945
Total Iron	74010
Total Manganese	01055
Total Aluminum	01105
Bacteriological	
Laboratory analyses	
Fecal coliforms	31614
Fecal streptococci	31673

FIELD CHEMISTRY

Temperature, dissolved oxygen, conductivity, turbidity, pH, alkalinity and acidity were measured at the collection site. Temperature and dissolved oxygen were measured using a YSI dissolved oxygen meter. Conductivity was measured with a Beckman conductivity bridge; turbidity with a LaMotte turbidity kit; and pH with an Orion pH meter. Alkalinity was measured by titrating a known volume of sample water to pH 4.5 with 0.1N sulfuric acid (H_2SO_4). Acidity was measured by titrating a known quantity of sample water to pH 8.3 with 0.1N sodium hydroxide (NaOH).

LABORATORY ANALYSES

Analytical results were compared with established water quality standards (Table 4) for the downstream state on each interstate stream.

Fecal coliforms were found to frequently exceed water quality standards. The instream standard is based on a geometric mean of five samples collected within 30 days. The instream standard is applied to the monitoring data even though the samples were not collected within a 30 day period. The geometric means presented in this report only serve as a indicator of areas where water quality standards may be exceeded and help identify areas where future studies may be needed. A useful tool for determining the source of instream bacteria concentrations is the

TABLE 4

INSTREAM WATER QUALITY CRITERIA FOR SIGNATORY STATES

Parameter	Units	Range	Maryland	New York	Pennsylvania
Dissolved Oxygen	mg/l	minimum	5.0	5.0	5.0
Turbidity	J.T.U.	maximum	50	-	40
pH	S.U.	min - max	6.5 - 8.5	6.5 - 8.5	6.0 - 8.5
Alkalinity	mg/l	minimum	-	-	20[1]
Total ammonia as nitrogen	mg/l	maximum	-	0.5	1.5
Total nitrite/nitrate as nitrogen	mg/l	maximum	-	10	10
Total magnesium	mg/l	maximum	-	30	-
Total chlorides	mg/l	maximum	-	250	250
Total sulfates	mg/l	maximum	-	250	250
Total iron	mg/l	maximum	-	-	1.5
Total manganese	mg/l	maximum	-	1.0	0.3
Fecal coliform	density/100 ml	maximum[2]	200	200	200

[1] unless natural conditions are less

[2]

fecal coliform/fecal streptococci (FC/FS) ratio (Williams, 1976). A FC/FS ratio of 4.0 or more indicates that bacteria originate from a human waste source. A FC/FS ratio of 0.7 or less indicates that bacteria originate from an animal waste source. Values between 4.0 and 0.7 are inconclusive.

BENTHIC MACROINVERTEBRATES

Benthic macroinvertebrates were sampled between July and September each year. Macroinvertebrates are defined as aquatic insects and other invertebrates that are too large to pass through a #30 sieve. Qualitative sampling (presence of macroinvertebrate taxa) was done using a kick screen. A riffle area was raked and the dislodged macroinvertebrates were collected in a fine mesh seine stretched across the current. Specimens of different macroinvertebrates were collected and preserved in dilute formalin solution. This procedure was repeated until no new taxa were collected.

Quantitative data (number of macroinvertebrates per unit area) were collected using a Surber sampler. This device is a one foot square frame with a #30 mesh net. The sampler was placed on the substrate in a shallow riffle and the area enclosed by the frame was scrubbed with a brush. The current carried the dislodged macroinvertebrates into the net. Rocks within the frame were cleaned with a scrub brush to dislodge clinging or attached macroinvertebrates. The macroinvertebrates in the net were

removed, placed in a container and preserved with dilute formalin solution. Three Surber samples were collected at each station. The perserved specimens were stored and identified to generic level at a later date.

Benthic macroinvertebrates provide a sample of a stream's biiological health and serve as water quality indicators. Poor water quality causes physiological stress on macroinvertebrates and taxa sensitive to stress are rare or absent. Changes in the benthic macroinvertebrate community structure are manifested as a low number of taxa present, a low or high productivity of the stream, and low diversity or balance of the benthic macroinvertebrate community. These changes occur gradually as environmental perturbations or stress increase.

The number of macroinvertebrate taxa was counted from kick screen and Surber samples. In response to pollution stress, the number of taxa always decreases. Organisms sensitive to pollution stress are more likely to be absent from degraded waters. As pollution worsens, only the most tolerant organisms are present. Our sampling techniques generally produce 20 to 30 taxa from moderately productive streams experiencing no pollution stress. Numbers of taxa less than 20 are generally indicative of pollution stress although naturally infertile streams can also have reduced numbers of taxa.

Density estimated from Surber samples was used as an indicator of stream productivity. Pollution stress can result in low productivity (less than 33 individuals/ft^2) or high productivity (greater than 242/ft^2). The wide range between these extremes represents the typical variability of productivity in streams. Extremes in productivity may also be caused by natural conditions so this parameter by itself is not conclusive of pollution stress. However, in combination with other biological and chemical data it is useful for assessing water quality.

The density data was used to compute a diversity index value based on the Shannon-Weiner diversity index (EPA, 1973). This index generally gives values ranging from 0.0 to 5.0. Based on the results from prior surveys (McMorran, 1986b), classification categories have been developed relating the diversity index value to benthic community health. Values greater than 3.0 are typical of healthy benthic communitites experiencing no pollution stress. Values between 3.0 and 2.2 show depressed community structure that may be due to mild pollution stress. Values between 2.2 and 1.5 show signs of moderate stress and values less than 1.5 are indicative of severe stress.

RESULTS

STATIONS BETWEEN NEW YORK AND PENNSYLVANIA

SUSQ 365.0 - Susquehanna River at Windsor, New York

The Susquehanna River begins at Otsego Lake, Otsego County, New York and flows 92 miles before crossing the state line near Lanesboro, Pennsylvania. The drainage area upstream of this point, 1,882 square miles, is rural. Sampling was conducted at Windsor, New York, the location of the nearest bridge upstream from the Pennsylvania state line. Prior assessments (McMorran, 1985c; NYDEC, 1986) describe good water quality at this point. This station was included in the monitoring network because the large drainage area and corresponding large flow volume makes the Susquehanna River a major interstate stream. This station also serves as a control station for comparison with other interstate monitoring stations on the Susquehanna River.

A summary of monitoring results is given in Table 5. Discharges at this station were estimated from the USGS gage at Conklin, New York, about 25 miles downstream. The discharge was prorated by drainage area between the two stations. Most parameter values were within Pennsylvania water quality standards. Total iron and fecal coliform exceeded water quality standards.

Every observation of total iron exceeded the standard (1.5 mg/l). Concentrations ranged from 1.72 mg/l to 3.23 mg/l, averaging 2.42 mg/l. High concentrations of iron were observed

TABLE 5

SUMMARY OF MONITORING RESULTS FOR SUSQ 365.0

Susquehanna River at Windsor, New York
April 1986 to September 1987

Parameter (Units)[1]	Maximum		Minimum		Average	
	Conc.	Load[2]	Conc.	Load[2]	Conc.	Load[2]
Flow (cfs)	5612	NA	425	NA	2202	NA
Temperature (degrees C)	26.0	NA	0.0	NA	14.5	NA
Conductivity (umhos/cm)	305	NA	63	NA	177	NA
Dissolved Oxygen (mg/l)	14.4	NA	7.8	NA	10.3	NA
pH (standard units)	8.5	NA	7.20	NA	7.75	NA
Alkalinity (mg/l)	70.0	667	42.0	86	58.8	343
Acidity (mg/l)	28.0	91	0.0	0	8.2	41
Turbididty (J.T.U.)	10	NA	0	NA	5	NA
Biochemical Oxygen Demand (mg/l)	6.8	49	0.4	2	2.2	11
Total Ammonia as nitrogen (mg/l)	0.18	1	0.02K	0	0.08	0
Total Nitrite as nitrogen (mg/l)	0.014	0	0.004K	0	0.007	0
Total Nitrate as nitrogen (mg/l)	1.40	14	0.39	0	0.75	4
Total Phosphorus (mg/l)	0.18	2	0.03	0	0.07	0
Total Organic Carbon (mg/l)	11.2	78	1.9	4	5.5	32
Total Calcium (mg/l)	32.68	296	16.19	30	24.91	137
Total Magnesium (mg/l)	3.87	38	2.50	4	2.98	16
Total Chloride (mg/l)	19	121	6	13	9	49
Total Sulfate (mg/l)	30	271	10	22	19	112
Total Iron (mg/l)	3.23	43	1.72	3	2.42	15
Total Manganese (mg/l)	0.08	1	0.05K	0	0.02	0
Total Aluminum (mg/l)	0.51	7	0.15K	0	0.18	1
Fecal Coliform (density/100 ml)	2400	NA	20K	NA	278	NA
			geometric mean[3]		75	
Fecal Streptococci (density/100 ml)	1700	NA	20K	NA	211	NA
			geometric mean[3]		51	

[1] units for concentrations
[2] all loads in tons/day, NA = not applicable
[3] Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{\frac{1}{x}}$

remark codes: K = less than

at other monitoring stations throughout this subbasin (McMorran, 1985c) and seem to be a natural condition of streams in this subbasin.

Three observations of fecal coliform densities exceeded the standard of 200/100 ml. The overall mean density was 278/100 ml, but this value reflects the effect of two very high densities exceeding 1000/100 ml. The first observation (April 1986) had a low fecal coliform/fecal streptococci ratio (FC/FS) showing that animal wastes were the source of the bacteria. However, the other observation (September 1987) had a FC/FS ratio showing that the bacteria originated from human sources. In contrast, observations during the winter of 1987 showed coliforms to be nearly absent. The geometric mean density was only 75/100 ml and was more representative of typical concentrations.

No benthic samples were collected in 1986 because high stream discharge prevented access to suitable riffle areas. In 1987, benthic sampling produced 35 macroinvertebrate taxa including ten mayfly genera. Riffle beetles (Coleoptera: Elmidae), flatheaded mayflies (Ephemeroptera: Heptageniidae) and common netspinning caddisflies (Trichoptera: Hydropsychidae) were dominant. The estimated density of 142/ft^2 shows moderate productivity. A diverse and healthy macroinvertebrate community is shown by a diversity index value of 4.0. The healthy macroinvertebrate community shows no signs of stress due to water quality.

SUSQ 340.0 - Susquehanna River at Kirkwood, New York

This station is located 25 miles downstream from SUSQ 365.0. This reach between the two state line crossings has been subject to past water quality degradation (Rudisill, 1979). This degradation resulted from sewage discharges from the Pennsylvania boroughs of Lanesboro, Susquehanna, Oakland, Great Bend and Hallstead and occurred during low flow periods. A sewage treatment plant now serves Lanesboro, Susquehanna and Oakland and construction of a plant is planned to serve Great Bend and Hallstead. Good water quality was observed by McMorran (1985c) in this reach but citizen complaints about water quality indicates that pollution still impacts this reach.

A summary of monitoring results is given in Table 6. Parameter values met New York State Water Quality Standards and no signs were observed of the problems reported by local citizens. The water quality standard for pH was exceeded in September 1986. No explanation is obvious from the data, but this value was not too high to be due to natural processes. Four observations of fecal coliform exceeded the standard (200/100 ml) with a maximum density of 600/100 ml. However, both the overall arithmetic and geometric mean densities were less than 200/100 ml showing that overall fecal coliform concentrations meet the standard.

TABLE 6

SUMMARY OF MONITORING RESULTS FOR SUSQ 340.0

Susquehanna River at Kirkwood, New York
April 1986 to September 1987

Parameter (Units)[1]	Maximum		Minimum		Average	
	Conc.	Load[2]	Conc.	Load[2]	Conc.	Load[2]
Flow (cfs)	6740	NA	510	NA	2644	NA
Temperature (degrees C)	27.0	NA	0.0	NA	14.7	NA
Conductivity (umhos/cm)	225	NA	59	NA	162	NA
Dissolved Oxygen (mg/l)	15.0	NA	8.1	NA	10.5	NA
pH (standard units)	8.70	NA	6.90	NA	7.70	NA
Alkalinity (mg/l)	60.0	727	36.0	88	49.1	376
Acidity (mg/l)	20.0	120	2.0	0	9.3	60
Turbididty (J.T.U.)	25	NA	1	NA	7	NA
Biochemical Oxygen Demand (mg/l)	5.2	59	0.4	2	2.2	14
Total Ammonia as nitrogen (mg/l)	0.26	2	0.04	0	0.09	1
Total Nitrite as nitrogen (mg/l)	0.012	0	0.004	0	0.007	0
Total Nitrate as nitrogen (mg/l)	1.09	16	0.19	0	0.63	5
Total Phosphorus (mg/l)	0.27	2	0.03	0	0.07	1
Total Organic Carbon (mg/l)	7.9	84	1.3	6	5.1	36
Total Calcium (mg/l)	27.86	332	13.45	35	21.77	144
Total Magnesium (mg/l)	3.62	44	2.31	5	2.85	19
Total Chloride (mg/l)	23	127	6	15	9	59
Total Sulfate (mg/l)	32	310	10	25	18	127
Total Iron (mg/l)	3.36	52	1.37	3	2.44	18
Total Manganese (mg/l)	0.11	1	0.05K	0	0.06	0
Total Aluminum (mg/l)	0.92	8	0.15K	0	0.04	2
Fecal Coliform (density/100 ml)	600	NA	20K	NA	196	NA
			geometric mean[3]		87	
Fecal Streptococci (density/100 ml)	5500	NA	20K	NA	415	NA
			geometric mean[3]		63	

[1] units for concentrations
[2] all loads in tons/day, NA = not applicable
[3] Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{\frac{1}{x}}$

remark codes: K= less than

Benthic sampling produced 29 macroinvertebrate taxa including eight mayfly genera and eight caddisfly genera. Flatheaded mayflies (Ephemeroptera: Heptageniidae), midges (Diptera: Chironomidae) and riffle beetles (Coleoptera: Elmidae) were dominant. Samples collected during 1986 were sparse due to a poor sampling site. Samples collected during 1987 show productivity (density of 90/ft^2) and diversity (4.2) indicative of a healthy benthic community. The benthic macroinvertebrate community shows no signs of stress due to water quality.

SUSQ 289.1 - Susquehanna River at Sayre, Pennsylvania

From Kirkwood, the Susquehanna River flows through New York for 50 miles to its last crossing of the New York - Pennsylvania state line near Sayre. The river corridor is occupied by intensive urban development between Binghamton and Owego. Many industrial and municipal waste water discharges enter the Susquehanna River in this reach, thus a potential exists for water quality impacts that could exceed water quality standards.

A summary of monitoring results is given in Table 7. Parameter values met Pennsylvania water quality standards with the exceptions of total iron and fecal coliform. Every observation of total iron exceeded the standard of 1.5 mg/l. Concentrations ranged from 1.71 to 3.72 mg/l, averaging 2.58 mg/l. These figures are comparable to concentrations at upstream monitoring stations and are characteristic of natural levels in most streams in this subbasin.

TABLE 7

SUMMARY OF MONITORING RESULTS FOR SUSQ 289.1

Susquehanna River at Sayre, Pennsylvania
April 1986 to September 1987

Parameter (Units)[1]	Maximum		Minimum		Average	
	Conc.	Load[2]	Conc.	Load[2]	Conc.	Load[2]
Flow (cfs)	13200	NA	850	NA	5771	NA
Temperature (degrees C)	29.0	NA	0.0	NA	15.5	NA
Conductivity (umhos/cm)	390	NA	84	NA	213	NA
Dissolved Oxygen (mg/l)	14.6	NA	7.7	NA	10.3	NA
pH (standard units)	8.50	NA	7.00	NA	7.80	NA
Alkalinity (mg/l)	86.0	1,853	52.0	129	65.3	720
Acidity (mg/l)	20.0	144	0.0	0	6.6	57
Turbididty (J.T.U.)	20	NA	3	NA	9	NA
Biochemical Oxygen Demand (mg/l)	6.4	113	0.4	4	2.3	28
Total Ammonia as nitrogen (mg/l)	0.22	5	0.03	0	0.10	1
Total Nitrite as nitrogen (mg/l)	0.026	0	0.004	0	0.013	0
Total Nitrate as nitrogen (mg/l)	1.31	35	0.23	1	0.80	13
Total Phosphorus (mg/l)	0.20	5	0.03	0	0.09	1
Total Organic Carbon (mg/l)	9.8	200	1.0K	0	6.2	92
Total Calcium (mg/l)	39.50	779	20.53	73	26.73	382
Total Magnesium (mg/l)	6.49	122	3.05	12	4.31	60
Total Chloride (mg/l)	26	383	9	46	15	195
Total Sulfate (mg/l)	30	748	10	53	20	296
Total Iron (mg/l)	3.72	94	1.71	6	2.58	42
Total Manganese (mg/l)	0.14	3	0.05K	0	0.07	1
Total Aluminum (mg/l)	1.75	21	0.15K	0	0.43	7
Fecal Coliform (density/100 ml)	2300	NA	20K	NA	564	NA
			geometric mean[3]		285	
Fecal Streptococci (density/100 ml)	2100	NA	20K	NA	426	NA
			geometric mean[3]		182	

[1] units for concentrations
[2] all loads in tons/day, NA = not applicable
[3] Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{\frac{1}{x}}$

remark codes: K = less than

Ten of eighteen observations of fecal coliform exceeded the standard. Based on FC/FS ratios, two of these observations were due to human waste sources and two to animal waste sources; the remaining six are inconclusive. The geometric mean density of 285/100 ml shows that high concentrations occur at a frequency warranting more detailed study.

Benthic sampling produced 31 macroinvertebrate taxa including twelve mayfly genera. Flatheaded mayflies (Ephemeroptera: Heptageniidae), midges (Diptera: Chironomidae), and common netspinning caddisflies (Trichoptera: Hydropsychidae) were dominant. Estimated densities of 93/ft^2 (1986) and 205/ft^2 (1987) show that the Susquehanna River is moderately productive. Diversity index values of 3.3 (1986) and 3.8 (1987) show a well balanced community. The healthy macroinvertebrate community shows no sign of stress due to water quality.

SNAK 2.3 - Snake Creek near Brookdale, Pennsylvania

Snake Creek drains portions of northern Susquehanna County, Pennsylvania and crosses the Pennsylvania - New York state line 2.3 miles upstream from its confluence with the Susquehanna River. This stream was monitored to investigate an earlier observation of low dissolved oxygen concentrations (McMorran, 1985c).

A summary of monitoring results is presented in Table 8. No evidence of dissolved oxygen problems were observed. Dissolved

TABLE 8

SUMMARY OF MONITORING RESULTS FOR SNAK 2.3

Snake Creek near Brookdale, Pennsylvania
April 1986 to September 1987

Parameter (Units)	Maximum	Minimum	Average
Temperature (degrees C)	25.0	0.0	13.2
Conductivity (umhos/cm)	210	49	95
Dissolved Oxygen (mg/l)	14.4	8.1	10.9
pH (standard units)	8.00	6.70	7.30
Alkalinity (mg/l)	30.0	12.0	21.0
Acidity (mg/l)	50.0	1.0	12.0
Turbididty (J.T.U.)	30	0	5
Biochemical Oxygen Demand (mg/l)	4.8	0.4	1.9
Total Ammonia as nitrogen (mg/l)	0.22	0.01	0.09
Total Nitrite as nitrogen (mg/l)	0.010	0.004K	0.003
Total Nitrate as nitrogen (mg/l)	0.64	0.22	0.44
Total Phosphorus (mg/l)	0.50	0.01K	0.07
Total Organic Carbon (mg/l)	9.5	1.4	3.8
Total Calcium (mg/l)	10.12	5.27	7.98
Total Magnesium (mg/l)	2.98	2.08	2.53
Total Chloride (mg/l)	13	5	7
Total Sulfate (mg/l)	29	10	18
Total Iron (mg/l)	2.76	0.24	2.00
Total Manganese (mg/l)	0.08	0.05K	0.02
Total Aluminum (mg/l)	0.86	0.15K	0.13
Fecal Coliform (density/100 ml)	1,000	20K	228
		geometric mean[1]	66
Fecal Streptococci (density/100 ml)	7,700	20K	710
		geometric mean[1]	107

[1]Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{-x}$

remark codes: K = less than

oxygen concentrations ranged from 8.1 to 14.4 mg/l, averaging 10.9 mg/l. These dissolved oxygen values are typical of clean streams and show no signs of degradation.

Parameter values met New York Water Quality Standards except for fecal coliform which exceeded the standard on seven occasions. FC/FS ratios indicate that four high observations were due to human waste sources, and two can be attributed to animal waste sources. Fecal coliform densities ranged from 1000 to less than 20/100 ml. The arithmetic mean density was 228/100 ml, but the geometric mean density of 66/100 ml shows that most observations met the standard.

Benthic sampling produced 33 macroinvertebrate taxa including ten mayfly genera. Midges (Diptera: Chironomidae), flatheaded mayflies (Ephemeroptera: Heptageniidae) and common netspinning caddisflies (Trichoptera: Hydropsychidae) were dominant. Estimated densities of 128/ft^2 (1986) and 76/ft^2 (1987) show moderate productivity. Diversity index values of 2.7 (1986) and 3.4 (1987) show healthy benthic communities. The healthy macroinvertebrate communities show little stress due to water quality.

CAYT 1.7 - Cayuta Creek at Waverly, New York

Cayuta Creek originates from Cayuta Lake in Schuyler County, New York. Cayuta Creek flows southward, crossing into Pennsylvania at Waverly, New York, 1.7 miles upstream from its

confluence with the Susquehanna River. Over the past twenty years the lower two miles of Cayuta Creek was badly degraded by waste discharges from a dairy products plant in Waverly (Malione and others, 1984). In 1982, a new sewage treatment plant at Waverly became operational and treated the dairy product wastes. Recent studies (McMorran, 1985c) found improved water quality in Cayuta Creek.

A summary of monitoring results is presented in Table 9. Parameter values met Pennsylvania water quality standards except for total iron and fecal coliform. Total iron ranged from 1.54 to 3.00 mg/l, averaging 2.28 mg/l. These values are characteristic of natural stream concentrations as they are also found in many streams in this part of the Basin.

Fecal coliform densities exceeded the standard on nine occasions, ranging from 3,700 to 220/100 ml. The overall arithmetic and geometric mean densities were 481 and 158/100 ml, respectively. A possible source of bacteria is the Waverly Waste Water Treatment Plant, which discharges a short distance upstream. However, a review of effluent data revealed that only one high fecal coliform event occurred during the sampling period. Also, the FC/FS ratio shows that four of the high observations and six of the total observations were due to animal waste sources. Though the waste water treatment plant may be contributing bacteria to the stream, it is not the only source.

TABLE 9

SUMMARY OF MONITORING RESULTS FOR CAYT 1.7

Cayuta Creek at Waverly, New York
April 1986 to September 1987

Parameter (Units)	Maximum	Minimum	Average
Temperature (degrees C)	28.0	1.0	14.8
Conductivity (umhos/cm)	870	124	296
Dissolved Oxygen (mg/l)	14.8	8.9	11.0
pH (standard units)	8.40	7.00	7.80
Alkalinity (mg/l)	124.0	32.0	78.7
Acidity (mg/l)	30.0	0.0	8.5
Turbididty (J.T.U.)	10	0	3
Biochemical Oxygen Demand (mg/l)	4.4	0.4	1.6
Total Ammonia as nitrogen (mg/l)	0.22	0.02	0.08
Total Nitrite as nitrogen (mg/l)	0.060	0.004K	0.011
Total Nitrate as nitrogen (mg/l)	2.64	0.26	0.88
Total Phosphorus (mg/l)	0.84	0.05	0.18
Total Organic Carbon (mg/l)	9.6	1.7	5.4
Total Calcium (mg/l)	61.00	17.27	31.02
Total Magnesium (mg/l)	9.30	3.50	5.74
Total Chloride (mg/l)	121	11	32
Total Sulfate (mg/l)	102	10	32
Total Iron (mg/l)	3.00	1.54	2.28
Total Manganese (mg/l)	0.05	0.05K	0.01
Total Aluminum (mg/l)	0.79	0.15K	0.13
Fecal Coliform (density/100 ml)	3,700	20K	481
		geometric mean[1]	158
Fecal Streptococci (density/100 ml)	1,400	20K	352
		geometric mean[1]	153

[1]Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{-x}$

remark codes: K = less than

Benthic sampling produced 34 macroinvertebrate taxa including eleven mayfly genera. Midges (Diptera: Chironomidae) and common netspinning caddisflies (Trichoptera: Hydropsychidae) were dominant. Density estimates of 612/ft^2 (1986) and 91/ft^2 (1987) show above average productivity in Cayuta Creek. Diversity values of 3.3 (1986) and 3.4 (1987) show healthy benthic communities. Few signs were observed of the pollution stress once found on the macroinvertebrate community of Cayuta Creek.

CHEM 12.0 - Chemung River at Chemung, New York

The Chemung River is a large tributary to the Susquehanna River, draining an area of 2,595 square miles. The Chemung River crosses the New York - Pennsylvania state line three times. The monitoring station is located at the most upstream crossing of the state line, twelve miles upstream from the confluence with the Susquehanna River. The Chemung River receives waste water discharges from the cities of Corning and Elmira, New York. Municipal waste from Elmira degrades water quality in the Chemung River downstream past the state line (NYDEC, 1986).

A summary of monitoring results is presented in Table 10. Parameter values met Pennsylvania Water Quality Standards with the exceptions of total iron, turbidity and fecal coliform. Seventeen out of eighteen observations of total iron exceeded the standard. Observations ranged from 0.10 to 13.60 mg/l, averaging 2.80 mg/l. These results are comparable to results from other stations and seem to be natural concentrations.

TABLE 10

SUMMARY OF MONITORING RESULTS FOR CHEM 12.0

Chemung River at Chemung, New York
April 1986 to September 1987

Parameter (Units)[1]	Maximum Conc.	Maximum Load[2]	Minimum Conc.	Minimum Load[2]	Average Conc.	Average Load[2]
Flow (cfs)	4,390	NA	255	NA	1,648	NA
Temperature (degrees C)	29.0	NA	1.0	NA	15.8	NA
Conductivity (umhos/cm)	500	NA	108	NA	293	NA
Dissolved Oxygen (mg/l)	15.0	NA	7.8	NA	10.3	NA
pH (standard units)	8.50	NA	7.40	NA	7.89	NA
Alkalinity (mg/l)	122.0	792	54.0	84	85.5	337
Acidity (mg/l)	18.0	91	0.0	0	6.3	25
Turbididty (J.T.U.)	1,000	NA	0	NA	77	NA
Biochemical Oxygen Demand (mg/l)	7.6	40	0.4	1	2.3	9
Total Ammonia as nitrogen (mg/l)	0.34	4	0.03	0	0.13	1
Total Nitrite as nitrogen (mg/l)	0.052	0	0.004	0	0.022	0
Total Nitrate as nitrogen (mg/l)	1.10	9	0.06	0	0.68	3
Total Phosphorus (mg/l)	0.67	8	0.02	0	0.15	1
Total Organic Carbon (mg/l)	10.6	87	1.4	5	6.9	29
Total Calcium (mg/l)	46.86	312	0.50	6	32.39	116
Total Magnesium (mg/l)	11.73	79	1.00	8	7.58	27
Total Chloride (mg/l)	46	181	14	32	24	85
Total Sulfate (mg/l)	47	367	22	26	33	134
Total Iron (mg/l)	13.60	154	0.10	1	2.80	16
Total Manganese (mg/l)	0.40	5	0.05	0	0.11	1
Total Aluminum (mg/l)	6.10	2	0.15K	0	0.55	0
Fecal Coliform (density/100 ml)	5,700	NA	20K	NA	1,002	NA
			geometric mean[3]		210	
Fecal Streptococci (density/100 ml)	51,000	NA	20K	NA	3,321	NA
			geometric mean[3]		62	

[1] units for concentrations
[2] all loads in tons/day, NA = not applicable
[3] Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{\frac{1}{x}}$

remark codes: K = less than

Turbidity exceeded the standard on two occasions, reaching a high value of 1000 Jackson Turbidity Units (JTU) in September 1987. The high values were associated with storm runoff events when the stream carried high sediment loads. Levels of turbidity associated with non-storm events are much lower, as shown by thirteen observations of 10 JTU or less.

Fecal coliform densities exceeded the standard on ten occasions, ranging from 300 to 5700/100 ml. The overall arithmetic and geometric mean densities were 1002 and 210/100 ml, respectively. Human wastes were the major sources of these high bacteria densities as shown by the FC/FS ratio. Six of the high observations and seven overall exceed the ratio of 4.0. Animal wastes also make a contribution as shown by very high fecal strep counts on two occasions. The major source of human waste is the city of Elmira, New York (McMorran, 1985b). The sewage treatment system is overloaded, but it is being upgraded and should be operational by July 1988.

Benthic sampling produced 33 macroinvertebrate taxa including ten mayfly genera and eight caddisfly genera. Midges (Diptera: Chironomidae), flatheaded mayflies (Ephemeroptera: Heptageniidae) and common netspinning caddisflies (Trichoptera: Hydropsychidae) were dominant. Density estimates show that the Chemung River is moderately productive. Diversity index values of 2.7 (1986) and 3.4 (1987) show little stress due to water quality. Healthy biological communities in the Chemung River show no water quality related stress.

TIOG 10.8 - Tioga River at Lindley, New York

The Tioga River is a tributary to the Chemung River. It originates in Bradford County, Pennsylvania and crosses the Pennsylvania - New York state line at Lawrenceville, Pennsylvania. Thirty miles of the Tioga River between its headwaters and Tioga Lake is polluted by acid mine drainage originating from coal mines in the Blossburg area. This section of river is devoid of aquatic life due to high levels of acidity and heavy metals. In the past, degradation extended downstream to Corning, New York. This problem has been improved downstream of Tioga Lake by buffering its outflow with alkaline waters stored in Hammond Lake.

A summary of monitoring results is presented in Table 11. Parameter values met New York State Water Quality Standards with the exception of fecal coliform. Fecal coliform densities exceeded 200/100 ml on seven occasions, ranging from 220 to 5,100/100 ml. The overall arithmetic and geometric mean densities were 444 and 89/100 ml, respectively. The FC/FS ratio shows that three high observations were due to human sources, and two were due to animal sources. The high concentrations were indicative of intermittant sources of bacteria but overall concentrations seem to meet the standard.

Benthic sampling produced 30 macroinvertebrate taxa including seven mayfly genera and seven caddisfly genera. Midges (Diptera: Chironomidae), common netspinning caddisflies

TABLE 11

SUMMARY OF MONITORING RESULTS FOR TIOG 10.8

Tioga River at Lindley, New York
April 1986 to September 1987

Parameter (Units)[1]	Maximum		Minimum		Average	
	Conc.	Load[2]	Conc.	Load[2]	Conc.	Load[2]
Flow (cfs)	1,210	NA	78	NA	366	NA
Temperature (degrees C)	28.0	NA	2.0	NA	16.1	NA
Conductivity (umhos/cm)	330	NA	120	NA	206	NA
Dissolved Oxygen (mg/l)	15.6	NA	8.0	NA	10.2	NA
pH (standard units)	7.65	NA	6.70	NA	7.30	NA
Alkalinity (mg/l)	67.0	85	22.0	11	34.6	33
Acidity (mg/l)	16.0	20	3.0	1	7.4	8
Turbididty (J.T.U.)	9	NA	0	NA	4	NA
Biochemical Oxygen Demand (mg/l)	4.8	5	0.4	0	1.8	1
Total Ammonia as nitrogen (mg/l)	0.14	0	0.02K	0	0.09	0
Total Nitrite as nitrogen (mg/l)	0.016	0	0.004K	0	0.007	0
Total Nitrate as nitrogen (mg/l)	1.34	2	0.26	0	0.57	1
Total Phosphorus (mg/l)	0.16	0	0.02	0	0.05	0
Total Organic Carbon (mg/l)	8.8	12	1.4	1	4.3	4
Total Calcium (mg/l)	30.48	50	15.21	6	21.99	19
Total Magnesium (mg/l)	10.75	12	3.63	1	6.10	5
Total Chloride (mg/l)	19	23	6	2	10	9
Total Sulfate (mg/l)	90	108	12	5	47	43
Total Iron (mg/l)	2.78	9	1.62	0	2.25	2
Total Manganese (mg/l)	1.15	1	0.10	0	0.44	0
Total Aluminum (mg/l)	0.59	2	0.15K	0	0.15	0
Fecal Coliform (density/100 ml)	5,100	NA	20K	NA	444	NA
			geometric mean[3]		89	
Fecal Streptococci (density/100 ml)	3600	NA	20K	NA	307	NA
			geometric mean[3]		34	

[1] units for concentrations
[2] all loads in tons/day, NA = not applicable
[3] Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{\frac{1}{x}}$

remark codes: K = less than

(Trichoptera: Hydropsychidae) and tubemaking caddisflies (Trichoptera: Polycentropodidae) were dominant. Density estimates of 84/ft^2 (1987) and 236/ft^2 (1986) show moderate to high productivity in the Tioga River. Diversity index values of 2.4 (1986) and 3.2 (1987) show healthy benthic communities. The healthy macroinvertebrate communities show little stress due to water quality.

SEEL 10.3 - Seeley Creek Near Seeley Creek, New York

Seeley Creek originates near Daggett, Pennsylvania and it crosses the Pennsylvania - New York state line 10.3 miles upstream from its confluence with the Chemung River. Stream survey work conducted in 1984 (McMorran, 1985b) found depressed macroinvertebrate communities near Mosherville, about one mile upstream from the state line. Seeley Creek was included in the monitoring network to determine if stress on the macroinvertebrate community was occurring due to a water quality problem, and, if a problem existed, to determine if it was exceeding water quality standards in New York.

A summary of monitoring results is presented in Table 12. Parameter values were characteristic of streams draining rural, sparsely developed watersheds. Most concentrations were low compared to other streams. Only one value exceeded New York State Water Quality Standard, a fecal coliform density of 950/100 ml in September 1986. Most of the fecal coliform densities were low, less than 100/100 ml, and FC/FS ratios show

TABLE 12

SUMMARY OF MONITORING RESULTS FOR SEEL 10.3

Seeley Creek near Seeley, New York
April 1986 to September 1987

Parameter (Units)	Maximum	Minimum	Average
Temperature (degrees C)	25.0	3.0	15.0
Conductivity (umhos/cm)	480	124	234
Dissolved Oxygen (mg/l)	13.4	7.6	10.0
pH (standard units)	8.20	7.50	7.80
Alkalinity (mg/l)	134.0	44.0	81.0
Acidity (mg/l)	12.0	1.0	6.0
Turbididty (J.T.U.)	5	0	1
Biochemical Oxygen Demand (mg/l)	3.2	0.4K	1.3
Total Ammonia as nitrogen (mg/l)	0.27	0.02K	0.06
Total Nitrite as nitrogen (mg/l)	0.010	0.004K	0.003
Total Nitrate as nitrogen (mg/l)	0.76	0.18	0.40
Total Phosphorus (mg/l)	0.11	0.02K	0.04
Total Organic Carbon (mg/l)	11.2	1.0K	5.1
Total Calcium (mg/l)	46.48	19.04	30.54
Total Magnesium (mg/l)	7.09	3.15	5.04
Total Chloride (mg/l)	15	6	10
Total Sulfate (mg/l)	35	10	21
Total Iron (mg/l)	2.60	1.51	2.08
Total Manganese (mg/l)	0.06	0.05K	0.00
Total Aluminum (mg/l)	0.54	0.15K	0.04
Fecal Coliform (density/100 ml)	950	20K	111
		geometric mean[1]	43
Fecal Streptococci (density/100 ml)	720	20K	146
		geometric mean[1]	33

[1] Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{-x}$

remark codes: K = less than

that animal sources were the primary cause of bacteria in the stream. Dairy farming is the primary land use in the watershed and the numerous livestock are likely sources for the bacteria.

Benthic sampling produced 35 macroinvertebrate taxa including eleven mayfly genera. Midges (Diptera: Chironomidae), small squaregilled mayflies (Ephemeroptera: Caenidae), flatheaded mayflies (Ephemeroptera: Heptageniidae) and little stout crawling mayflies (Ephemeroptera: Tricorythidae) were dominant. Density estimates of $58/ft^2$ (1987) and $352/ft^2$ (1986) indicate moderate to high productivity in Seeley Creek. Diversity is somewhat depressed, ranging from 2.5 (1986) to 1.9 (1987). The macroinvertebrate community shows signs of mild to moderate stress. However, none of the water quality parameters seem to be the cause.

RESULTS

STATIONS BETWEEN MARYLAND AND PENNSYLVANIA

The Susquehanna River crosses the Pennsylvania - Maryland border near Peach Bottom, Pennsylvania, fifteen miles upstream from the mouth. The water quality of this river reach is impacted by impoundments on the river. Safe Harbor Dam, Holtwood Dam and York Haven Dam are located upstream of the state line and influence water quality and flow characteristics of the river. The point where the river crosses the state line is impounded by Conowingo Dam and is also influenced by the operation of the

Muddy Run pumped storage facility. Nuclear power plants at Three Mile Island and Peach Bottom, and coal burning power plants at Sunbury, Brunner Island and Holtwood also utilize the Susquehanna River for cooling water. Two sampling stations were established on this reach. The upstream station was located at Columbia, Pennsylvania upstream of the three larger impoundments. This station serves as a control for the downstream station at Lapidum/Port Deposit, Maryland. These two stations bracket the major impoundments and provide data on their impact on the water quality of the Susquehanna River.

SUSQ 44.5 - Susquehanna River at Columbia, Pennsylvania

A summary of monitoring results is presented in Table 13. Parameter values met Pennsylvania Water Quality Standards and reflect good overall water quality. However, several occurrences of excessive levels were observed.

Excessive values of pH, ammonia-nitrogen and total manganese were observed on rare occasions. The pH standard of 8.5 was exceeded on two occasions with values of 8.75 in August 1986 and 8.90 in January 1987. The average over the monitoring period was 7.88. Ammonia-nitrogen exceeded the standard of 1.50 mg/l on one occasion: 2.42 mg/l in September 1986. Ammonia-nitrogen had an overall average of 0.22 mg/l. Total manganese exceeded the standard of 1.0 mg/l during September 1986 with a value of 1.44 mg/l. This was a lone occurrence; the remaining seventeen observations were less than 0.50 mg/l. This observation occurred

TABLE 13

SUMMARY OF MONITORING RESULTS FOR SUSQ 44.5

Susquehanna River at Columbia, Pennsylvania
April 1986 to September 1987

Parameter (Units)[1]	Maximum		Minimum		Average	
	Conc.	Load[2]	Conc.	Load[2]	Conc.	Load[2]
Flow (cfs)	67,700	NA	5,480	NA	29,195	NA
Temperature (degrees C)	30.0	NA	4.0	NA	19.0	NA
Conductivity (umhos/cm)	430	NA	94	NA	261	NA
Dissolved Oxygen (mg/l)	14.8	NA	7.5	NA	10.4	NA
pH (standard units)	8.90	NA	6.90	NA	7.90	NA
Alkalinity (mg/l)	72.0	8,774	26.0	725	49.9	3,170
Acidity (mg/l)	12.0	1,244	0.0	0	5.7	381
Turbididty (J.T.U.)	25	NA	0	NA	9	NA
Biochemical Oxygen Demand (mg/l)	6.4	581	0.4	0	2.6	164
Total Ammonia as nitrogen (mg/l)	2.42	39	0.04	2	0.37	9
Total Nitrite as nitrogen (mg/l)	0.026	3	0.004	0	0.013	1
Total Nitrate as nitrogen (mg/l)	4.10	269	0.48	15	1.44	88
Total Phosphorus (mg/l)	0.17	31	0.05	1	0.10	7
Total Organic Carbon (mg/l)	7.9	757	1.3	74	5.2	329
Total Calcium (mg/l)	42.00	3,153	17.25	579	27.53	1,674
Total Magnesium (mg/l)	13.57	891	4.57	194	8.18	483
Total Chloride (mg/l)	25	1,828	8	311	15	853
Total Sulfate (mg/l)	132	6,304	13	192	60	3,415
Total Iron (mg/l)	5.45	996	0.48	7	2.64	208
Total Manganese (mg/l)	1.44	84	0.06	2	0.33	18
Total Aluminum (mg/l)	2.31	422	0.15	0	0.67	54
Fecal Coliform (density/100 ml)	1,000	NA	20K	NA	311	NA
			geometric mean[3]		83	
Fecal Streptococci (density/100 ml)	580	NA	20K	NA	287	NA
			geometric mean[3]		176	

[1] units for concentrations
[2] all loads in tons/day, NA = not applicable
[3] Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{-x}$

remark codes: K = less than

at the same time as the high ammonia-nitrogen observation, but no relationship is postulated at this time.

Total iron concentrations exceeded the standard of 1.5 mg/l on fifteen of eighteen occasions. The values ranged from 0.48 to 5.45 mg/l, averaging 2.53 mg/l. Possible point sources of high total iron are few and these high levels may reflect natural concentrations.

Fecal coliform densities exceeded the standard of 200/100 ml on six occasions, ranging from 220 to 1100/100 ml. The arithmetic mean density was 243/100 ml, but the geometric mean density of 83/100 ml reflects the occurrence of eight observations of 40/100 ml or less. FC/FS ratios show that one high observation was due to human waste sources, two to animal waste sources, and the remainder were uncertain. The variation in fecal coliform concentrations may be indicative of intermittant sources of bacteria.

Benthic sampling produced 32 macroinvertebrate taxa including thirteen mayfly genera. Midges (Diptera: Chironomidae) and flatheaded mayflies (Ephemeroptera: Heptageniidae) were dominant. Estimated densities of 852/ft^2 (1986) and 138/ft^2 (1987) show that very productive conditions occur in the Susquehanna River. Diversity index values of 3.3 (1986) and 3.1 (1987) show a healthy macroinvertebrate community and no stress due to water quality.

SUSQ 4.8 - Susquehanna River at Lapidum/Port Deposit, Maryland

This station is a transect across the Susquehanna River between Lapidum and Port Deposit. Water quality seems to be good as no parameter values exceeded Maryland water quality standards (Table 14). No benthic sampling was conducted due to an absence of a suitable riffle in the vicinity of this station.

CNWG 4.4 - Conowingo Creek at Pleasant Grove, Pennsylvania

Conowingo Creek drains portions of southern Lancaster County, Pennsylvania and flows south across the Pennsylvania - Maryland state line about four miles upstream from its confluence with the Susquehanna River. This station is monitored because prior surveys (McMorran, 1986b) found high bacteria concentrations.

A summary of monitoring results is presented in Table 15. Parameter values met Maryland Water Quality Standards except for turbidity and fecal coliform. Turbidity exceeded the standard in July 1986 when the stream carried a high sediment load after a rainstorm.

Fecal coliform exceeded the standard on fifteen of sixteen occasions. Densities ranged from 180 to 7,500/100 ml. The arithmetic and geometric mean densities, 1,796 and 993/100 ml, respectively, show that excessive bacteria concentrations are common in Conowingo Creek. FC/FS ratios show that five observations were due to human waste sources and none were due to

TABLE 14

SUMMARY OF MONITORING RESULTS FOR SUSQ 4.8

Susquehanna River at Lapidum/Port Deposit, Maryland
May 1986 to September 1987

Parameter (Units)[1]	Maximum Conc.	Maximum Load[2]	Minimum Conc.	Minimum Load[2]	Average Conc.	Average Load[2]
Flow (cfs)	77,800	NA	4,570	NA	30,179	NA
Temperature (degrees C)	29.0	NA	3.0	NA	17.7	NA
Conductivity (umhos/cm)	375	NA	116	NA	238	NA
Dissolved Oxygen (mg/l)	14.2	NA	5.6	NA	9.6	NA
pH (standard units)	7.80	NA	6.70	NA	7.51	NA
Alkalinity (mg/l)	58.0	6,722	28.0	679	45.1	3,546
Acidity (mg/l)	20.0	2,084	2.0	71	7.3	641
Turbididty (J.T.U.)	20	NA	0	NA	8	NA
Biochemical Oxygen Demand (mg/l)	12.0	1,251	0.4	17	3.4	277
Total Ammonia as nitrogen (mg/l)	0.40	42	0.07	2	0.16	13
Total Nitrite as nitrogen (mg/l)	0.090	9	0.012	0	0.029	2
Total Nitrate as nitrogen (mg/l)	2.99	376	0.80	10	1.49	131
Total Phosphorus (mg/l)	0.14	21	0.03	1	0.07	7
Total Organic Carbon (mg/l)	12.2	1,271	2.6	58	5.6	459
Total Calcium (mg/l)	31.64	3,678	17.51	368	24.09	1,847
Total Magnesium (mg/l)	10.25	1,048	4.77	119	7.05	536
Total Chloride (mg/l)	18	2,311	10	222	14	1,043
Total Sulfate (mg/l)	71	7,562	28	802	45	3,459
Total Iron (mg/l)	3.68	697	1.36	28	2.58	220
Total Manganese (mg/l)	0.60	33	0.08	1	0.19	15
Total Aluminum (mg/l)	1.35	242	0.15K	0	0.43	47
Fecal Coliform (density/100 ml)	120	NA	20K	NA	36	NA
			geometric mean[3]		14	
Fecal Streptococci (density/100 ml)	220	NA	20K	NA	65	NA
			geometric mean[3]		42	

[1] units for concentrations
[2] all loads in tons/day, NA = not applicable
[3] Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{\frac{1}{x}}$

remark codes: K = less than

TABLE 15

SUMMARY OF MONITORING RESULTS FOR CNWG 4.4

Conowingo Creek at Pleasant Grove, Pennsylvania
May 1986 to September 1987

Parameter (Units)	Maximum	Minimum	Average
Temperature (degrees C)	26.0	3.5	16.2
Conductivity (umhos/cm)	310	95	193
Dissolved Oxygen (mg/l)	15.0	5.7	9.9
pH (standard units)	7.80	6.60	7.30
Alkalinity (mg/l)	46.0	16.0	31.8
Acidity (mg/l)	20.0	3.0	8.9
Turbididty (J.T.U.)	-	-	-
Biochemical Oxygen Demand (mg/l)	7.2	0.4	2.8
Total Ammonia as nitrogen (mg/l)	0.21	0.03	0.12
Total Nitrite as nitrogen (mg/l)	0.179	0.016	0.043
Total Nitrate as nitrogen (mg/l)	8.34	4.66	6.58
Total Phosphorus (mg/l)	0.52	0.05	0.14
Total Organic Carbon (mg/l)	16.2	1.1	4.7
Total Calcium (mg/l)	14.34	12.23	13.40
Total Magnesium (mg/l)	8.78	6.73	7.88
Total Chloride (mg/l)	18	13	15
Total Sulfate (mg/l)	88	10K	16
Total Iron (mg/l)	6.60	0.81	2.98
Total Manganese (mg/l)	0.19	0.05	0.09
Total Aluminum (mg/l)	3.81	0.15K	0.66
Fecal Coliform (density/100 ml)	7,500	180	1,796
		geometric mean[1]	993
Fecal Streptococci (density/100 ml)	2,400	60	536
		geometric mean[1]	345

[1]Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{-x}$

remark codes: K = less than

animal waste sources. High bacteria concentrations in Conowingo Creek need more detailed study to determine the location of these sources.

Benthic sampling produced 30 macroinvertebrate taxa including nine mayfly genera. Small minnow mayflies (Ephemeroptera: Baetidae), flatheaded mayflies (Ephemeroptera: Heptageniidae), brushlegged mayflies (Ephemeroptera: Oligoneuridae) and common netspinning caddisflies (Trichoptera: Hydropsychidae) were dominant. Estimated density ranged from $428/ft^2$ (1986) to $72/ft^2$ (1987) showing moderate to high productivity in Conowingo Creek. Diversity index values of 3.8 (1986) and 3.3 (1987) show healthy benthic communities. These healthy macroinvertebrate communities show no stress due to water quality.

OCTO 8.6 - Octoraro Creek Near Rock Springs, Maryland

Octoraro Creek originates in Chester and Lancaster counties, Pennsylvania and crosses into Cecil County, Maryland 8.6 miles upstream from the confluence with the Susquehanna River. The watershed is predominantly rural, although several small boroughs discharge treated waste waters to Octoraro Creek. Octoraro Lake is an impoundment at the confluence of the East and West Branches of Octoraro Creek. This impoundment serves as a water supply source for the Chester Water Company. The state of Maryland has raised concerns regarding impacts on water quality and hydrology in Octoraro Creek due to the diversion from Octoraro Lake.

A summary of monitoring results is presented in Table 16. Parameter values met Maryland Water Quality Standards with the exception of fecal coliform. Five observations of fecal coliform densities exceeded the standard, ranging from 300 to 7,900/100 ml. Two observations were due to human waste sources using FC/FS ratios. The geometric mean density, 202/100 ml, shows that typical fecal coliform concentrations are high and this parameter should be studied in more detail.

Benthic sampling produced 31 macroinvertebrate taxa including nine caddisfly genera. Humpless casemaking caddisflies (Trichoptera: Brachycentridae) were very abundant, comprising 58% of all specimens collected. Midges (Diptera: Chironomidae) and common netspinning caddisflies (Trichoptera: Hydropsychidae) were also dominant. High productivity in Octoraro Creek is shown in the estimated densities of 1857/ft^2 (1986) and 188/ft^2 (1987). Depressed diversity values, 2.5 (1986) and 2.0 (1987), reflect the dominance of humpless casemaking caddisflies in Octoraro Creek. These caddisflies are filter feeders and their abundance may indicate the abundance of phytoplankton in the stream originating from Octoraro Lake.

DEER 44.2 - Deer Creek Near West Liberty, Maryland

Deer Creek originates in southern York County, Pennsylvania and crosses into Baltimore County, Maryland 44.2 miles upstream from the confluence with the Susquehanna River. The watershed is rural and agriculture is the primary land use. Impacts on the

TABLE 16

SUMMARY OF MONITORING RESULTS FOR OCTO 8.6

Octoraro Creek near Rock Springs, Maryland
May 1986 to September 1987

Parameter (Units)	Maximum	Minimum	Average
Temperature (degrees C)	28.0	3.5	17.0
Conductivity (umhos/cm)	340	78	201
Dissolved Oxygen (mg/l)	14.6	5.8	10.2
pH (standard units)	8.90	6.70	7.60
Alkalinity (mg/l)	66.0	10.0	42.1
Acidity (mg/l)	20.0	0.0	7.5
Turbididty (J.T.U.)	80	0	13
Biochemical Oxygen Demand (mg/l)	11.5	0.4	3.3
Total Ammonia as nitrogen (mg/l)	0.43	0.02	0.15
Total Nitrite as nitrogen (mg/l)	0.066	0.010	0.033
Total Nitrate as nitrogen (mg/l)	6.57	2.81	4.46
Total Phosphorus (mg/l)	0.33	0.07	0.14
Total Organic Carbon (mg/l)	10.0	1.1	5.5
Total Calcium (mg/l)	17.74	12.13	15.51
Total Magnesium (mg/l)	10.72	7.91	9.05
Total Chloride (mg/l)	18	11	14
Total Sulfate (mg/l)	44	10K	21
Total Iron (mg/l)	7.00	1.80	2.89
Total Manganese (mg/l)	0.22	0.05K	0.09
Total Aluminum (mg/l)	4.02	0.15K	0.71
Fecal Coliform (density/100 ml)	7,900	40	796
		geometric mean[1]	202
Fecal Streptococci (density/100 ml)	4,400	20K	405
		geometric mean[1]	48

[1]Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{-x}$

remark codes: K = less than

stream include high bacteria and nutrient concentrations (McMorran, 1986b).

A summary of monitoring results is presented in Table 17. Parameter values met Maryland Water Quality Standards except for fecal coliform, which exceeded the standard on ten occasions. FC/FS ratios show that three observations exceeding the standard and seven observations overall were due to human waste sources. Only three of the observations were due to animal waste sources. The high arithmetic and geometric mean densities, 271 and 1206/100 ml, respectively, show that high bacteria concentrations occur frequently enough to deserve more detailed study.

Benthic sampling produced 39 macroinvertebrate taxa including fourteen mayfly genera. Benthic sampling was better in 1986; high water in 1987 resulted in a very poor sample. Midges (Diptera: Chironomidae), brushlegged mayflies (Ephemeroptera: Oligoneuridae) and common netspinning caddisflies (Trichoptera: Hydropsychidae) were dominant. The estimated density of 1431/ft^2 (1986) shows that Deer Creek is a highly productive stream. The diversity index value of 3.3 (1986) indicates a balanced benthic community. The healthy benthic parameters show no stress due to water quality.

EBAU 1.5 - Ebaughs Creek Near Stewartstown, Pennsylvania

Ebaughs Creek originates in southern York County, Pennsylvania and crosses into Baltimore County, Maryland one mile

TABLE 17

SUMMARY OF MONITORING RESULTS FOR DEER 44.2

Deer Creek near West Liberty, Maryland
April 1986 to September 1987

Parameter (Units)	Maximum	Minimum	Average
Temperature (degrees C)	27.0	4.0	15.3
Conductivity (umhos/cm)	270	69	169
Dissolved Oxygen (mg/l)	14.5	6.8	10.3
pH (standard units)	8.00	6.70	7.40
Alkalinity (mg/l)	80.0	10.0	32.3
Acidity (mg/l)	20.0	1.5	6.5
Turbididty (J.T.U.)	10	0	3
Biochemical Oxygen Demand (mg/l)	10.4	0.4K	2.6
Total Ammonia as nitrogen (mg/l)	0.32	0.02	0.10
Total Nitrite as nitrogen (mg/l)	0.016	0.004	0.010
Total Nitrate as nitrogen (mg/l)	6.15	3.74	4.76
Total Phosphorus (mg/l)	0.11	0.01	0.05
Total Organic Carbon (mg/l)	7.6	1.0	3.3
Total Calcium (mg/l)	16.21	11.29	13.68
Total Magnesium (mg/l)	5.62	4.49	5.06
Total Chloride (mg/l)	22	12	17
Total Sulfate (mg/l)	28	10K	6
Total Iron (mg/l)	7.20	0.31	2.74
Total Manganese (mg/l)	0.14	0.05K	0.03
Total Aluminum (mg/l)	0.52	0.15K	0.16
Fecal Coliform (density/100 ml)	9,600	20K	1,206
		geometric mean[3]	271
Fecal Streptococci (density/100 ml)	1,000	20K	336
		geometric mean[3]	103

[1]Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{-x}$

remark codes: K = less than

upstream from the confluence with Deer Creek. Past degradation of Ebaughs Creek occurred due to municipal waste water discharges from Stewartstown. A sewage treatment plant now serves Stewartstown and this station monitors current water quality in Ebaughs Creek.

A summary of monitoring results is presented in Table 18. Parameter values met Maryland Water Quality Standards except for fecal coliform. Fecal coliform densities exceeded the standard on six occasions, ranging from 220 to 2,500/100 ml. Of these five observations, only one was due to human waste sources using FC/FS ratios, while three were due to animal waste sources. Overall, seven observations were due to animal waste sources. The geometric mean density of 112/100 ml shows that overall bacteria levels meet the standard.

Benthic sampling produced 38 macroinvertebrate taxa including fourteen mayfly genera. Midges (Diptera: Chironomidae), small minnow mayflies (Ephemeroptera: Baetidae), flatheaded mayflies (Ephemeroptera: Heptageniidae) and common netspinning caddisflies (Trichoptera: Hydropsychidae) were dominant. Estimated densities, 799/ft^2 (1986) and 123/ft^2 (1987), show high productivity in Ebaughs Creek. Diversity index values, 3.3 (1986) and 3.1 (1987), show healthy benthic communities. The healthy benthic community shows no stress due to water quality.

TABLE 18

SUMMARY OF MONITORING RESULTS FOR EBAU 1.5

Ebaughs Creek near Stewartstown, Pennsylvania
April 1986 to September 1987

Parameter (Units)	Maximum	Minimum	Average
Temperature (degrees C)	23.0	5.5	14.5
Conductivity (umhos/cm)	210	73	144
Dissolved Oxygen (mg/l)	14.2	6.7	10.6
pH (standard units)	7.80	6.70	7.40
Alkalinity (mg/l)	34.0	12.0	23.9
Acidity (mg/l)	32.0	2.0	7.5
Turbididty (J.T.U.)	5	0	3
Biochemical Oxygen Demand (mg/l)	7.2	0.4K	2.1
Total Ammonia as nitrogen (mg/l)	0.51	0.02	0.13
Total Nitrite as nitrogen (mg/l)	0.068	0.004	0.028
Total Nitrate as nitrogen (mg/l)	7.01	4.84	5.95
Total Phosphorus (mg/l)	0.12	0.03	0.08
Total Organic Carbon (mg/l)	6.7	1.0	2.8
Total Calcium (mg/l)	14.23	9.17	11.05
Total Magnesium (mg/l)	5.28	4.17	4.62
Total Chloride (mg/l)	15	8	12
Total Sulfate (mg/l)	28	10K	5
Total Iron (mg/l)	2.98	0.48	2.30
Total Manganese (mg/l)	0.11	0.05K	0.03
Total Aluminum (mg/l)	0.30	0.15K	0.13
Fecal Coliform (density/100 ml)	2,500	20K	337
		geometric mean[3]	112
Fecal Streptococci (density/100 ml)	800	20K	307
		geometric mean[3]	76

[1]Computing formula: $(n_1 \times n_2 \times \ldots \times n_x)^{-x}$

remark codes: K = less than

OTHER INTERSTATE STREAMS

Bill Hess Creek, Camp Brook, Trowbridge Creek and Parks Creek were each sampled once. Attempts were also made to sample several other small streams but low flow conditions caused nearly dry stream conditions. Results of the stream samples are presented in Table 19. Water quality seems to be good in each stream. Few parameter values exceeded water quality standards. In fact, most parameters had low concentrations typical of the rural characteristics of the watersheds they drain.

Total iron exceeded Pennsylvania Water Quality Standards in every stream. This seems to be a natural condition for streams in the Basin. Fecal coliform exceeded the standard in Camp Brook. The FC/FS ratio shows that this high observation is due to human waste sources. Further study should be done of this parameter in Camp Brook to determine if the standard is exceeded regularly.

TABLE 19

DATA FOR OTHER INTERSTATE STREAMS

Parameter	units	Bill Hess Creek	Camp Brook	Trowbridge Creek	Parks Creek
Date		07-21-86	08-18-86	05-20-87	09-15-87
Time		15:00	15:00	08:00	10:55
Temperature	deg. C	17.0	20.0	10.0	15.0
Dissolved Oxygen	mg/l	8.6	8.6	11.1	10.7
Conductivity	umhos/cm	270	320	68	78
Turbidity	J.T.U.	0	-	5	0
pH	S.U.	-	8.2	7.2	8.1
Alkalinity	mg/l	-	152.0	15.0	62.0
Acidity	mg/l	-	1.0	12.0	1.0
Biochemical Oxygen Demand	mg/l	0.4	0.4	2.8	0.4
Total NH_3-NH_4 as nitrogen	mg/l	0.04	0.03	0.10	0.09
Total NO_2 as nitrogen	mg/l	0.004	0.004	0.004K	0.004K
Total NO_3 as nitrogen	mg/l	0.28	0.04	0.28	0.30
Total Phosphorus	mg/l	0.03	0.06	0.03	0.04
Total Organic Carbon	mg/l	4.9	3.5	1.2	1.1
Total Calcium	mg/l	44.21	36.83	5.95	18.41
Total Magnesium	mg/l	10.09	9.21	2.11	5.71
Total Chlorides	mg/l	10	9	4	5
Total Sulfates	mg/l	39	22	12	24
Total Iron	mg/l	1.81	2.66	2.64	2.09
Total Manganese	mg/l	0.05K	0.05K	0.05K	0.05K
Total Aluminum	mg/l	0.15K	0.15K	0.15K	0.15K
Fecal Coliform	density/100 ml	20	440	20	100
Fecal Streptococci	density/100 ml	60	40	160	320

remark codes: K = less than

CONCLUSIONS

Few of the parameter values were observed to exceed water quality standards. This indicates that overall pollution control efforts are successful at preventing water quality degradation. However, several parameter values did exceed standards and show that additional controls may be necessary.

Fecal coliform densities most commonly exceeded water quality standards. This parameter is indicative of pathogenic organisms that can compromise water supply and recreational uses. Most stations had overall fecal coliform bacteria densities that were indicative of intermittant sources of bacteria. These sources were both human and animal wastes. Some stations had high fecal bacteria densities that showed consistent sources of pollution. The Susquehanna River at Sayre, Pennsylvania, the Chemung River, Conowingo Creek, Octoraro Creek and Deer Creek had high fecal coliform concentrations and should be studied more intensively to determine the location of pollution sources.

A few incidents of high turbidity were related to rainfall runoff. These observations are indicative of sediment and erosion control problems.

Total iron exceeded the Pennsylvania water quality standard at most stations. The high total iron concentrations showed no relationship to the land use in the watershed or to the presence or absence of waste water discharges. Total iron concentrations

in other streams in the Basin also tend to exceed the standard (McMorran, 1986b). These observations lead to the conclusion that high total iron concentrations are of natural origins in many streams in the Basin.

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APPENDIX A

MONITORING RESULTS

SYMBOLS

K = less than reported value

* = value exceeds water quality standard

TABLE A-1

MONITORING RESULTS FROM SUSQ 365.0, SUSQUEHANNA RIVER AT WINDSOR, NEW YORK

DATE	TIME	Flow cfs	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/l	pH S.U.	Alkalinity mg/l	Alkalinity tons/day	Acidity mg/l	Acidity tons/day	Turbidity J.T.U.
04/16/86	08:15	3713	7.0	165	-	7.85	65.0	652	3.0	30	10
05/28/86	08:45	2356	19.0	160	8.8		-	-	-	-	5
06/24/86	13:30	1840	21.0	170	9.8	7.85	60.0	298	-	-	10
07/23/86	08:45	763	22.5	195	8.4	-	-	-	-	-	5
08/21/86	09:00	2123	23.5	170	9.2	8.50	62.0	355	0.0	0	-
09/23/86	09:15	425	15.5	230	9.3	-	-	-	-	-	-
10/15/86	08:50	1507	12.0	210	11.0	-	-	-	-	-	-
11/18/86	08:45	3281	4.5	150	14.4	-	-	-	-	-	5
12/09/86	09:00	4555	2.0	160	12.6	7.70	53.0	652	2.0	25	1
01/13/87	09:50	1732	-	180	-	7.90	58.0	271	10.0	47	5
02/26/87	09:30	1174	0.0	-	14.1	-	-	-	-	-	-
03/24/87	09:40	5612	5.0	155	12.8	7.50	44.0	667	6.0	91	5
04/28/87	09:20	2581	-	200	-	7.70	68.0	474	6.0	42	5
05/20/87	09:35	8271	4.0	180	9.6	7.90	66.0	147	7.0	16	0
06/10/87	12:00	1165	17.5	145	9.6	7.70	62.0	195	12.0	38	5
07/20/87	12:30	949	26.0	305	7.8	7.50	55.0	141	28.0	72	10
08/18/87	09:55	453	25.0	175	7.9	7.65	70.0	86	10.0	12	0
09/15/87	12:00	4571	18.0	63	8.8	7.20	42.0	518	6.0	74	10
	MAXIMUM	5612	26.0	305	14.4	8.50	70.0	667	28.0	91	10
	MINIMUM	425	0.0	63	7.8	7.20	42.0	0	0.0	0	0
	AVERAGE	2202	14.5	177	10.3	7.75	58.8	343	8.2	41	5

DATE	TIME	Biological Oxygen Demand mg/l	Biological Oxygen Demand tons/day	Total Ammonia as Nitrogen mg/l	Total Ammonia as Nitrogen tons/day	Total Nitrite as Nitrogen mg/l	Total Nitrite as Nitrogen tons/day	Total Nitrate as Nitrogen mg/l	Total Nitrate as Nitrogen tons/day	Total Phosphorus mg/l	Total Phosphorus tons/day
04/16/86	08:15	1.0	10	0.10	1	0.008	0	0.79	8	0.08	1
04/16/86	08:15	1.0	10	0.10	1	0.008	0	0.79	8	0.08	1
05/28/86	08:45	3.2	20	0.13	1	0.010	0	0.57	4	0.07	0
06/24/86	13:30	2.8	14	0.10	0	0.006	0	0.57	3	0.08	0
07/23/86	08:45	1.6	3	0.10	0	0.004	0	0.54	1	0.06	0
08/21/86	09:00	0.4	2	0.04	0	0.006	0	0.47	3	0.06	0
09/23/86	09:15	1.6	2	0.10	0	0.004	0	1.40	2	0.06	0
10/15/86	08:50	0.8	3	0.02K	0	0.004	0	0.66	3	0.05	0
11/18/86	08:45	0.4	4	0.04	0	0.004K	0	0.72	6	0.04	0
12/09/86	09:00	0.8	10	0.07	1	0.004	0	0.90	11	0.04	0
01/13/87	09:50	1.2	6	0.06	0	0.006	0	1.09	5	0.03	0
02/26/87	09:30	0.8	3	0.05	0	0.008	0	1.17	4	0.04	0
03/24/87	09:40	1.0	15	0.05	1	0.006	0	0.95	14	0.05	1
04/28/87	09:20	2.4	17	0.08	1	0.006	0	0.91	6	0.06	0
05/20/87	09:35	4.0	9	0.08	0	0.010	0	0.71	2	0.04	0
06/10/87	12:00	2.8	9	0.09	0	0.014	0	0.65	2	0.18	1
07/20/87	12:30	3.2	8	0.12	0	0.006	0	0.43	1	0.06	0
08/18/87	09:55	6.8	8	0.18	0	0.008	0	0.39	0	0.07	0
09/15/87	12:00	4.0	49	0.11	1	0.008	0	0.51	6	0.13	2
	MAXIMUM	6.8	49	0.18	1	0.014	0	1.40	14	0.18	2
	MINIMUM	0.4	2	0.02K	0	0.004K	0	0.39	0	0.03	0
	AVERAGE	2.2	11	0.08	0	0.007	0	0.75	4	0.07	0

TABLE A-1 (continued)

MONITORING RESULTS FROM SUSQ 365.0, SUSQUEHANNA RIVER AT WINDSOR, NEW YORK

DATE	TIME	Total Organic Carbon mg/l	Total Organic Carbon tons/day	Total Calcium mg/l	Total Calcium tons/day	Total Magnesium mg/l	Total Magnesium tons/day	Total Chloride mg/l	Total Chloride tons/day	Total Sulfate mg/l	Total Sulfate tons/day
04/16/86	08:15	2.6	26	24.60	247	2.75	28	10	100	24	241
05/28/86	08:45	9.7	62	22.91	146	2.52	16	8	51	10	64
06/24/86	13:30	7.8	39	26.06	129	2.86	14	8	40	10	50
07/23/86	08:45	6.4	13	28.71	59	3.34	7	9	19	16	33
08/21/86	09:00	4.2	24	23.11	132	3.06	18	6	34	28	160
09/23/86	09:15	6.0	7	32.68	38	3.87	4	11	13	19	22
10/15/86	08:50	5.6	23	29.23	119	3.03	12	8	33	30	122
11/18/86	08:45	4.0	35	23.20	206	2.52	22	6	53	22	195
12/09/86	09:00	4.9	60	23.05	283	2.64	32	6	74	22	271
01/13/87	09:50	2.4	11	27.67	129	2.87	13	9	42	24	112
02/26/87	09:30	6.4	20	19.80	63	3.10	10	10	32	20	63
03/24/87	09:40	4.7	71	19.52	296	2.50	38	8	121	15	227
04/28/87	09:20	11.2	78	26.70	186	2.86	20	7	49	28	195
05/20/87	09:35	1.9	4	31.09	69	3.43	8	10	22	13	29
06/10/87	12:00	2.8	9	27.05	85	3.31	10	19	60	15	47
07/20/87	12:30	6.3	16	21.83	56	3.29	8	10	26	13	33
08/18/87	09:55	6.5	8	24.91	30	3.10	4	11	13	20	24
09/15/87	12:00	6.2	77	16.19	200	2.57	32	8	99	11	136
	MAXIMUM	11.2	78	32.68	296	3.87	38	19	121	30	271
	MINIMUM	1.9	4	16.19	30	2.50	4	6	13	10	22
	AVERAGE	5.5	32	24.91	137	2.98	169	49	19	112	

DATE	TIME	Total Iron mg/l	Total Iron tons/day	Total Manganese mg/l	Total Manganese tons/day	Total Aluminum mg/l	Total Aluminum tons/day	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/16/86	08:15	2.79*	28	0.05K	0	0.36	4	1000*	1700
05/28/86	08:45	12.99*	19	0.05K	0	0.32	2	200	100
06/24/86	13:30	1.89*	9	0.05K	0	0.21	1	100	20
07/23/86	08:45	1.88*	4	0.06	0	0.23	0	60	60
08/21/86	09:00	2.13*	12	0.05K	0	0.36	2	100	300
09/23/86	09:15	2.68*	3	0.07	0	0.15K	0	20	20
10/15/86	08:50	1.72*	7	0.05K	0	0.16	1	220*	80
11/18/86	08:45	2.06*	18	0.06	1	0.15K	0	160	160
12/09/86	09:00	2.23*	27	0.05K	0	0.15K	0	160	280
01/13/87	09:50	1.99*	9	0.05K	0	0.15K	0	140	40
02/26/87	09:30	2.02*	6	0.05K	0	0.15K	0	20K	20K
03/24/87	09:40	2.81*	43	0.06	1	0.43	7	20K	50
04/28/87	09:20	3.10*	22	0.05K	0	0.51	4	20	20
05/20/87	09:35	2.71*	6	0.05K	0	0.15K	0	40	20K
06/10/87	12:00	2.28*	7	0.05K	0	0.18	1	80	20K
07/20/87	12:30	2.74*	7	0.05K	0	0.15K	0	100	320
08/18/87	09:55	2.35*	3	0.06	0	0.15K	0	200	240
09/15/87	12:00	3.23*	40	0.08	1	0.46	6	2400*	400
	MAXIMUM	3.23	43	0.08	1	0.51	7	2400	1700
	MINIMUM	1.72	3	0.05K	0	0.15K	0	20K	20K
	AVERAGE	2.42	15	0.02	0	0.18	1	278	211

TABLE A-2

MONITORING RESULTS FROM SUSQ 340.0, SUSQUEHANNA RIVER AT KIRKWOOD, NEW YORK

DATE	TIME	Flow cfs	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/1	pH S.U.	Alkalinity mg/1	Alkalinity tons/day	Acidity mg/1	Acidity tons/day	Turbidity J.T.U.
04/16/86	09:30	4460	7.0	-	-	7.8	50.0	602	10.0	120	25
05/28/86	09:45	2830	19.0	140	9.4	-	-	-	-	-	10
06/24/86	15:15	2210	22.0	160	10.2	8.1	54.0	322	-	-	10
07/23/86	09:50	916	24.0	150	8.6	-	-	-	-	-	10
08/21/86	08:30	2550	24.0	150	9.9	8.0	53.0	365	2.0	14	-
09/23/86	08:45	510	15.0	210	8.9	8.7*	-	-	0.0	0	5
10/15/86	08:20	1810	13.0	205	11.0	-	-	-	-	-	-
11/18/86	08:00	3940	3.0	142	15.0	-	-	-	-	-	5
12/09/86	08:20	5470	2.0	145	12.4	7.8	48.0	709	4.0	59	1
01/13/87	09:15	2080	-	165	-	7.7	48.0	270	14.0	79	5
02/26/87	08:55	1410	0.0	-	14.6	-	-	-	-	-	-
03/24/87	09:05	6740	5.0	155	12.6	7.4	40.0	728	6.0	109	5
04/28/87	08:40	3100	-	165	-	6.9	51.0	427	10.0	84	5
05/20/87	08:55	994	14.5	180	9.8	7.8	59.0	158	7.0	19	5
06/10/87	11:15	1400	17.0	175	9.8	7.6	50.0	189	10.0	38	5
07/20/87	11:40	1140	27.0	225	8.1	7.7	40.0	123	20.0	62	10
08/18/87	09:10	544	24.0	165	8.2	7.6	60.0	88	10.0	15	5
09/15/87	12:40	5490	18.5	59	8.8	7.2	36.0	534	8.0	119	5
	MAXIMUM	6740	27.0	225	15.0	8.7	60.0	728	20.0	120	25
	MINIMUM	510	0.0	59	8.1	6.9	36.0	88	2.0	0	1
	AVERAGE	2644	14.7	162	10.5	7.7	49.1	376	9.3	60	7

DATE	TIME	Biological Oxygen Demand mg/1	Biological Oxygen Demand tons/day	Total Ammonia as Nitrogen mg/1	Total Ammonia as Nitrogen tons/day	Total Nitrite as Nitrogen mg/1	Total Nitrite as Nitrogen tons/day	Total Nitrate as Nitrogen mg/1	Total Nitrate as Nitrogen tons/day	Total Phosphorus mg/1	Total Phosphorus tons/day
04/16/86	09:30	1.5	18	0.10	1	0.010	0	0.67	8	0.12	1
05/28/86	09:45	2.0	15	0.11	1	0.012	0	0.53	4	0.07	1
06/24/86	15:15	2.5	15	0.09	1	0.008	0	0.41	2	0.09	1
07/23/86	09:50	3.2	8	0.10	0	0.008	0	0.49	1	0.05	0
08/21/86	08:30	0.8	6	0.11	1	0.008	0	0.39	3	0.05	0
09/23/86	08:45	2.0	3	0.06	0	0.006	0	0.62	1	0.05	0
10/15/86	08:20	0.4	2	0.05	0	0.004K	0	0.54	3	0.04	0
11/18/86	08:00	0.4	4	0.04	0	0.004K	0	0.68	7	0.04	0
12/09/86	08:20	0.4	6	0.05	1	0.004	0	0.84	12	0.04	1
01/13/87	09:15	1.6	9	0.05	0	0.006	0	1.05	6	0.03	0
02/26/87	08:55	0.8	3	0.05	0	0.006	0	1.09	4	0.03	0
03/24/87	09:05	3.0	55	0.05	1	0.004	0	0.88	16	0.04	1
04/28/87	08:40	2.0	17	0.11	1	0.006	0	0.73	6	0.06	1
05/20/87	08:55	4.4	12	0.09	0	0.008	0	0.61	2	0.05	0
06/10/87	11:15	4.0	15	0.26	1	0.010	0	0.70	3	0.27	1
07/20/87	11:40	2.0	6	0.10	0	0.006	0	0.37	1	0.07	0
08/18/87	09:10	5.2	8	0.13	0	0.008	0	0.19	0	0.06	0
09/15/87	12:40	4.0	59	0.14	2	0.008	0	0.55	8	0.13	2
	MAXIMUM	5.2	59	0.26	2	0.012	0	1.09	16	0.27	2
	MINIMUM	0.4	2	0.04	0	0.004K	0	0.19	0	0.03	0
	AVERAGE	2.2	14	0.09	1	0.007	0	0.63	5	0.07	1

TABLE A-2 (continued)

MONITORING RESULTS FROM SUSQ 340.0, SUSQUEHANNA RIVER AT KIRKWOOD, NEW YORK

DATE	TIME	Total Organic Carbon mg/l	Total Organic Carbon tons/day	Total Calcium mg/l	Total Calcium tons/day	Total Magnesium mg/l	Total Magnesium tons/day	Total Chloride mg/l	Total Chloride tons/day	Total Sulfate mg/l	Total Sulfate tons/day
04/16/86	09:30	3.3	40	20.27	244	2.64	32	10	120	24	289
05/28/86	09:45	7.9	60	19.22	147	2.31	18	7	53	10	76
06/24/86	15:15	7.4	44	23.20	138	2.74	16	7	42	10	60
07/23/86	09:50	7.6	19	23.09	57	3.07	8	9	22	14	35
08/21/86	08:30	4.4	30	20.43	141	2.77	19	6	41	25	172
09/23/86	08:45	5.3	7	27.76	38	3.62	5	11	15	18	25
10/15/86	08:20	5.5	27	27.28	133	2.95	14	8	39	32	156
11/18/86	08:00	4.0	43	21.20	226	2.52	27	7	74	21	223
12/09/86	08:20	5.7	84	21.57	319	2.53	37	6	89	21	310
01/13/87	09:15	1.3	7	24.28	136	2.58	14	9	51	24	135
02/26/87	08:55	6.9	26	17.22	66	3.05	12	11	42	20	76
03/24/87	09:05	4.2	76	18.28	333	2.41	44	7	127	12	218
04/28/87	08:40	7.8	65	19.22	161	2.69	23	7	59	28	234
05/20/87	08:55	2.3	6	27.86	75	3.26	9	10	27	15	40
06/10/87	11:15	4.1	15	24.94	94	3.54	13	23	87	15	57
07/20/87	11:40	6.1	19	18.99	58	2.94	9	10	31	10K	0
08/18/87	09:10	3.9	6	23.56	35	3.23	5	11	16	19	28
09/15/87	12:40	4.7	70	13.45	199	2.53	38	8	119	10	148
	MAXIMUM	7.9	84	27.86	333	3.62	44	23	127	32	310
	MINIMUM	1.3	6	13.45	35	2.31	5	6	15	10K	0
	AVERAGE	5.1	36	21.77	144	2.85	19	9	59	18	127

DATE	TIME	Total Iron mg/l	Total Iron tons/day	Total Manganese mg/l	Total Manganese tons/day	Total Aluminum mg/l	Total Aluminum tons/day	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/16/86	09:30	2.51	30	0.06	1	0.92	11	600*	5500
05/28/86	09:45	2.92	22	0.05K	0	0.38	3	100	100
06/24/86	15:15	2.00	12	0.05K	0	0.25	1	60	60
07/23/86	09:50	2.10	5	0.06	0	0.15K	0	40	20
08/21/86	08:30	2.75	19	0.07	0	0.15K	0	160	80
09/23/86	08:45	2.02	3	0.09	0	0.15K	0	180	60
10/15/86	08:20	1.37	7	0.05K	0	0.15K	0	140	100
11/18/86	08:00	2.02	21	0.08	1	0.15K	0	20K	360
12/09/86	08:20	2.41	36	0.05K	0	0.15K	0	220*	100
01/13/87	09:15	2.08	12	0.05K	0	0.15K	0	20K	20K
02/26/87	08:55	1.96	7	0.05K	0	0.15K	0	140	20K
03/24/87	09:05	2.85	52	0.05	1	0.38	7	20	20
04/28/87	08:40	2.94	25	0.05K	0	0.23	2	200	20
05/20/87	08:55	2.75	7	0.05K	0	0.15K	0	160	40
06/10/87	11:15	2.71	10	0.07	0	0.61	2	580*	80
07/20/87	11:40	2.58	8	0.07	0	0.25	1	580*	140
08/18/87	09:10	2.55	4	0.11	0	0.51	1	100	550
09/15/87	12:40	3.36	50	0.10	1	0.85	13	200	200
	MAXIMUM	3.36	52	0.11	1	0.92	13	600	5500
	MINIMUM	1.37	3	0.05K	0	0.15K	0	20K	20K
	AVERAGE	2.44	18	0.04	0	0.24	2	193	413

TABLE A-3

MONITORING RESULTS FROM SUSQ 289.1, SUSQUEHANNA RIVER AT SAYRE, PENNSYLVANIA

DATE	TIME	Flow cfs	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/l	pH S.U.	Alkalinity mg/l	Alkalinity tons/day	Acidity mg/l	Acidity tons/day	Turbidity J.T.U.
04/15/86	10:40	7740	8.5	200	-	8.0	62.0	129	62.0	42	10
05/27/86	13:00	8810	20.0	160	9.1	-	-	-	-	-	15
06/23/86	13:15	5720	21.0	200	9.6	8.5	64.0	988	0.0	0	10
07/21/86	12:10	4030	26.0	180	8.70	-	-	-	-	-	10
08/18/86	12:00	8100	23.5	195	8.3	8.0	70.0	1531	2.0	44	-
09/23/86	10:30	1100	17.0	340	10.2	8.30	-	-	0	0	10
10/15/86	10:00	4200	11.0	235	10.6	8.1	84.0	953	2.0	23	-
11/18/86	10:30	8230	4.0	168	14.2	-	-	-	-	-	10
12/09/86	10:15	13200	3.0	165	12.2	7.8	52.0	1853	4.0	143	3
01/13/87	11:05	4710	-	230	-	7.9	66.0	839	10.0	127	5
02/26/87	10:50	2750	0.0	-	14.6	-	-	-	-	-	-
03/24/87	10:55	12900	6.0	175	13.4	7.6	52.0	1811	4.0	139	5
04/28/87	10:45	6680	-	205	-	7.0	70.0	1263	7.0	126	10
05/20/87	10:55	1980	15.0	270	9.7	7.9	86.0	460	6.0	32	5
06/10/87	13:15	2660	19.0	190	10.0	7.3	62.0	445	20.0	144	5
07/20/87	14:40	1820	29.0	390	7.7	7.5	62.0	305	16.0	79	5
08/18/87	11:20	850	26.5	240	7.9	-	-	-	-	-	5
09/15/87	10:30	8400	18.0	84	8.3	7.3	54.0	1225	6.0	136	20
	MAXIMUM	13200	29.0	390	14.6	8.5	86.0	1853	20.0	144	20
	MINIMUM	850	0.0	84	7.7	7.0	52.0	129	0.0	0	3
	AVERAGE	5771	15.5	213	10.3	7.8	65.3	720	6.6	57	9

DATE	TIME	Biological Oxygen Demand mg/l	Biological Oxygen Demand tons/day	Total Ammonia as Nitrogen mg/l	Total Ammonia as Nitrogen tons/day	Total Nitrite as Nitrogen mg/l	Total Nitrite as Nitrogen tons/day	Total Nitrate as Nitrogen mg/l	Total Nitrate as Nitrogen tons/day	Total Phosphorus mg/l	Total Phosphorus tons/day
04/15/86	10:40	1.6	33	0.10	2	0.016	0	0.84	18	0.10	2
05/27/86	13:00	3.2	76	0.22	5	0.004	0	0.72	17	0.12	3
06/23/86	13:15	1.8	27	0.03	0	0.008	0	0.53	8	0.09	1
07/21/86	12:10	0.4	4	0.09	1	0.016	0	0.66	7	0.11	1
08/18/86	12:00	1.2	26	0.05	1	0.008	0	0.57	12	0.09	2
09/23/86	10:30	2.4	7	0.05	0	0.026	0	1.12	3	0.10	0
10/15/86	10:00	0.9	10	0.07	1	0.026	0	0.75	9	0.05	1
11/18/86	10:30	0.5	11	0.06	1	0.006	0	0.75	17	0.05	1
12/09/86	10:15	0.8	29	0.09	3	0.008	0	0.93	33	0.06	2
01/13/87	11:05	0.4	5	0.13	2	0.010	0	1.25	16	0.03	0
02/26/87	10:50	1.2	9	0.13	1	0.010	0	1.31	10	0.04	0
03/24/87	10:55	0.5	17	0.08	3	0.008	0	1.01	35	0.05	2
04/28/87	10:45	2.0	36	0.06	1	0.014	0	0.99	18	0.07	1
05/20/87	10:55	4.0	21	0.07	0	0.018	0	0.84	4	0.07	0
06/10/87	13:15	6.0	43	0.14	1	0.022	0	0.78	6	0.18	1
07/20/87	14:40	3.2	16	0.11	1	0.012	0	0.63	3	0.08	0
08/18/87	11:20	6.4	15	0.15	0	0.008	0	0.23	1	0.11	0
09/15/87	10:30	5.0	113	0.15	3	0.014	0	0.57	13	0.20	5
	MAXIMUM	6.4	113	0.22	5	0.026	0	1.31	35	0.20	5
	MINIMUM	0.4	4	0.03	0	0.004	0	0.23	1	0.03	0
	AVERAGE	2.3	28	0.10	1	0.013	0	0.80	13	0.09	1

TABLE A-3 (continued)

MONITORING RESULTS FROM SUSQ 289.1, SUSQUEHANNA RIVER AT SAYRE, PENNSYLVANIA

DATE	TIME	Total Organic Carbon mg/l	Total Organic Carbon tons/day	Total Calcium mg/l	Total Calcium tons/day	Total Magnesium mg/l	Total Magnesium tons/day	Total Chloride mg/l	Total Chloride tons/day	Total Sulfate mg/l	Total Sulfate tons/day
04/15/86	10:40	3.8	79	26.50	554	3.84	80	11	230	10	209
05/27/86	13:00	8.4	200	20.87	496	3.05	73	9	214	10	238
06/23/86	13:15	8.1	125	27.06	418	3.44	53	11	170	14	216
07/21/86	12:10	5.3	58	21.56	235	4.10	45	12	131	14	152
08/18/86	12:00	6.0	131	28.39	621	4.31	94	13	284	18	394
09/23/86	10:30	8.3	25	39.50	117	6.49	19	22	65	22	65
10/15/86	10:00	8.2	93	30.40	345	4.39	50	13	147	30	340
11/18/86	10:30	4.7	104	23.60	524	3.55	79	10	222	23	511
12/09/86	10:15	5.6	200	21.86	779	3.42	122	9	321	21	748
01/13/87	11:05	1.0K	0	29.94	381	4.16	53	20	254	27	343
02/26/87	10:50	8.8	65	23.70	176	5.15	38	26	193	22	163
03/24/87	10:55	5.0	174	20.53	715	3.49	122	11	383	20	697
04/28/87	10:45	9.8	177	25.72	464	4.09	74	11	198	28	505
05/20/87	10:55	2.6	14	37.94	203	5.81	31	18	96	17	91
06/10/87	13:15	4.7	34	29.01	208	4.99	36	23	165	16	115
07/20/87	14:40	9.4	46	22.08	109	4.06	20	14	69	21	103
08/18/87	11:20	6.3	14	31.95	73	5.37	12	20	46	23	53
09/15/87	10:30	5.5	125	20.55	466	3.80	86	14	318	17	386
	MAXIMUM	9.8	200	39.50	779	6.49	122	26	383	30	748
	MINIMUM	1.0K	0	20.53	73	3.05	12	9	46	10	53
	AVERAGE	6.1	92	26.73	382	4.31	60	15	195	20	296

DATE	TIME	Total Iron mg/l	Total Iron tons/day	Total Manganese mg/l	Total Manganese tons/day	Total Aluminum mg/l	Total Aluminum tons/day	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/15/86	10:40	2.66*	56	0.05K	0	0.15K	0	120	40
05/27/86	13:00	3.10*	74	0.07	2	0.76	18	600*	100
06/23/86	13:15	2.40*	37	0.05K	0	0.41	6	140	60
07/21/86	12:10	3.65*	40	0.08	1	1.75	19	1300*	2100
08/18/86	12:00	2.64*	58	0.05K	0	0.18	4	280*	320
09/23/86	10:30	2.15*	6	0.11	0	0.28	1	200	200
10/15/86	10:00	2.59*	29	0.05K	0	0.60	7	900*	300
11/18/86	10:30	2.07*	46	0.06	1	0.18	4	1500*	1000
12/09/86	10:15	2.35*	84	0.05K	0	0.15K	0	2300*	1200
01/13/87	11:05	1.71*	22	0.05K	0	0.15K	0	1200*	580
02/26/87	10:50	1.92*	14	0.05K	0	0.15K	0	120	60
03/24/87	10:55	2.70*	94	0.06	2	0.43	15	300*	150
04/28/87	10:45	3.06*	55	0.05	1	0.50	9	240*	20
05/20/87	10:55	2.49*	13	0.05K	0	0.15K	0	80	20
06/10/87	13:15	2.35*	17	0.07	1	0.51	4	60	140
07/20/87	14:40	2.50*	12	0.05K	0	0.16	1	20	60
08/18/87	11:20	2.43*	6	0.09	0	0.36	1	100	220
09/15/87	10:30	3.72*	84	0.14	3	0.92	21	700*	1100
	MAXIMUM	3.72	94	0.14	3	1.75	21	2300	2100
	MINIMUM	1.71	6	0.05K	0	0.15K	0	20	20
	AVERAGE	2.58	42	0.07	1	0.43	7	564	426

TABLE A-4

MONITORING RESULTS FROM SNAK 2.3, SNAKE CREEK NEAR BROOKDALE, PENNSYLVANIA

DATE	TIME	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/1	pH S.U.	Alkalinity mg/1	Acidity mg/1	Turbidity J.T.U.	Biological Oxygen Demand mg/1	Total Ammonia as Nitrogen mg/1
04/16/86	11:00	7.0	70	-	7.0	14	2	30	1.0	0.06
05/28/86	11:00	18.0	80	11.0	-	-	-	0	1.6	0.07
06/24/86	14:30	21.0	92	10.0	7.3	22	-	0	1.0	0.07
07/23/86	11:15	20.0	100	9.8	-	-	-	5	1.2	0.01
08/21/86	08:10	20.5	96	10.0	7.9	30	1	-	0.8	0.04
09/23/86	08:20	14.0	110	9.9	8.0	-	-	0	2.8	0.10
10/14/86	08:00	14.0	100	10.6	-	-	-	-	0.4	0.06
11/18/86	07:30	3.0	75	14.0	-	1-	-	5	0.4	0.04
12/09/86	08:00	2.0	60	12.4	7.3	13	3	2	0.8	0.15
01/13/87	08:50	-	100	-	7.6	14	10	0	1.2	0.02
02/26/87	08:30	0.0	-	14.4	-	-	-	-	0.8	0.02
03/24/87	08:35	2.0	78	13.4	6.8	12	6	5	1.5	0.05
04/28/87	08:10	-	88	-	6.7	19	8	5	2.4	0.11
05/20/87	08:25	10.5	90	11.0	7.3	20	12	0	4.4	0.13
06/10/87	10:45	15.0	108	10.3	7.2	22	14	5	4.0	0.22
07/20/87	11:00	25.0	210	8.5	7.2	30	50	20	3.6	0.17
08/18/87	08:30	22.0	105	8.1	7.2	30	26	0	4.8	0.19
09/15/87	13:05	16.5	49	9.7	7.1	24	4	0	1.2	0.08
	MAXIMUM	25.0	210	14.4	8.0	30	50	30	4.8	0.22
	MINIMUM	0.0	49	8.1	6.7	12	1	0	0.4	0.01
	AVERAGE	13.2	95	10.9	7.3	21	12	5	1.9	0.09

DATE	TIME	Total Nitrite as Nitrogen mg/1	Total Nitrate as Nitrogen mg/1	Total Phosphorus mg/1	Total Organic Carbon mg/1	Total Calcium mg/1	Total Magnesium mg/1	Total Chloride mg/1	Total Sulfate mg/1
04/16/86	11:00	0.010	0.45	0.12	3.8	5.96	2.25	7	24
05/28/86	11:00	0.006	0.45	0.04	3.8	6.98	2.20	5	10
06/24/86	14:30	0.004K	0.36	0.06	9.5	8.67	2.65	6	10
07/23/86	11:15	0.004K	0.36	0.00	3.6	9.01	2.79	6	11
08/21/86	08:10	0.004	0.30	0.02	1.4	9.09	2.72	6	24
09/23/86	08:20	0.004K	0.62	0.04	4.7	9.55	2.98	7	12
10/14/86	08:00	0.004K	0.22	0.02	2.7	9.10	2.59	6	29
11/18/86	07:30	0.004K	0.44	0.03	2.5	7.03	2.16	5	22
12/09/86	08:00	0.004	0.50	0.03	3.2	7.00	2.21	5	21
01/13/87	08:50	0.004K	0.60	0.02	2.1	8.51	2.24	6	24
02/26/87	08:30	0.004K	0.64	0.02	4.1	5.27	2.56	10	25
03/24/87	08:35	0.004K	0.62	0.07	2.0	6.03	2.08	6	15
04/28/87	08:10	0.006	0.43	0.04	6.3	6.66	2.17	5	26
05/20/87	08:25	0.004	0.50	0.03	2.3	8.66	2.62	6	11
06/10/87	10:45	0.004K	0.46	0.50	4.4	8.01	2.69	6	14
07/20/87	11:00	0.006	0.27	0.05	6.8	8.76	2.96	13	13
08/18/87	08:30	0.004K	0.24	0.02	3.5	10.12	2.92	9	18
09/15/87	13:05	0.004K	0.50	0.10	2.2	9.18	2.81	7	14
	MAXIMUM	0.010	0.64	0.50	9.5	10.12	2.98	13	29
	MINIMUM	0.004K	0.22	0.00	1.4	5.27	2.08	5	10
	AVERAGE	0.003	0.44	0.07	3.8	7.98	2.53	7	18

TABLE A-4 (continued)

MONITORING RESULTS FROM SNAK 2.3, SNAKE CREEK NEAR BROOKDALE, PENNSYLVANIA

DATE	TIME	Total Iron mg/l	Total Manganese mg/l	Total Aluminum mg/l	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/16/86	11:00	2.60	0.05K	0.86	1000*	7700
05/28/86	11:00	2.57	0.05K	0.15K	260*	40
06/24/86	14:30	1.58	0.05K	0.34	60	40
07/23/86	11:15	1.92	0.05	0.15K	360*	80
08/21/86	08:10	2.00	0.05	0.15K	180	180
09/23/86	08:20	2.02	0.05K	0.15K	160	300
10/14/86	08:00	0.92	0.05K	0.15K	240*	520
11/18/86	07:30	2.03	0.08	0.15K	80	340
12/09/86	08:00	1.54	0.05K	0.15K	40	120
01/13/87	08:50	1.53	0.05K	0.17	20	20K
02/26/87	08:30	2.13	0.05K	0.46	20K	40
03/24/87	08:35	2.71	0.05	0.28	20K	60
04/28/87	08:10	0.24	0.05K	0.15K	20	20K
05/20/87	08:25	2.76	0.05K	0.15K	260*	140
06/10/87	10:45	2.18	0.05K	0.15K	270*	40
07/20/87	11:00	2.25	0.05	0.18	160	2400
08/18/87	08:30	2.31	0.05K	0.15K	20K	620
09/15/87	13:05	2.67	0.05K	0.15K	1000*	160
	MAXIMUM	2.76	0.08	0.86	1000	7700
	MINIMUM	0.24	0.05K	0.15K	20K	20K
	AVERAGE	2.00	0.02	0.13	228	710

TABLE A-5

MONITORING RESULTS FROM CAYT 1.7, CAYUTA CREEK AT WAVERLY, NEW YORK

DATE	TIME	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/1	pH S.U.	Alkalinity mg/1	Acidity mg/1	Turbidity J.T.U.	Biological Oxygen Demand mg/1	Total Ammonia as Nitrogen mg/1
04/15/86	11:30	8.0	175	-	8.0	78.0	-	0	0.8	0.13
05/27/86	13:30	20.0	190	8.9	-	-	-	0	0.4	0.07
06/23/86	13:40	20.0	240	10.4	8.4	84.0	0.0	0	1.5	0.03
07/21/86	12:20	22.5	170	11.0	-	-	-	5	0.4	0.08
08/18/86	12:30	19.0	235	9.2	7.9	74.0	2.0	-	0.8	0.05
09/23/86	11:00	17.5	870	10.1	-	-	-	5	2.4	0.02
10/15/86	10:45	10.0	360	11.5	8.0	110.0	2.0	-	0.8	0.04
11/18/86	11:00	9.0	215	-	-	-	-	0	0.4	0.03
12/09/86	10:30	3.0	180	14.1	7.7	48.0	3.0	1	0.4	0.03
01/13/87	11:30	-	325	-	8.0	68.0	6.0	5	0.8	0.05
02/26/87	11:15	1.0	-	14.8	-	-	-	-	0.8	0.05
03/24/87	11:15	6.5	165	13.3	7.4	32.0	12.0	10	1.5	0.06
04/28/87	11:05	-	215	-	7.0	60.0	7.0	5	1.6	0.07
05/20/87	11:30	12.0	360	11.4	7.9	94.0	6.0	0	2.0	0.10
06/10/87	13:40	20.0	220	10.4	7.6	90.0	20.0	5	4.0	0.19
07/20/87	14:30	28.0	550	9.9	7.8	124.0	30.0	5	4.4	0.22
08/18/87	12:20	24.5	440	9.6	-	-	-	0	2.8	0.09
09/15/87	10:00	15.5	124	10.0	7.6	82.0	6.0	5	2.4	0.05
	MAXIMUM	28.0	870	14.8	8.4	124.0	30.0	10	4.4	0.22
	MINIMUM	1.0	124	8.9	7.0	32.0	0.0	0	0.4	0.02
	AVERAGE	14.8	296	11.0	7.8	78.7	8.5	3	1.6	0.08

DATE	TIME	Total Nitrite as Nitrogen mg/1	Total Nitrate as Nitrogen mg/1	Total Phosphorus mg/1	Total Organic Carbon mg/1	Total Calcium mg/1	Total Magnesium mg/1	Total Chloride mg/1	Total Sulfate mg/1
04/15/86	11:30	0.014	0.29	0.09	1.7	19.07	3.99	11	12
05/27/86	13:30	0.004	0.28	0.06	6.3	23.90	4.74	11	10
06/23/86	13:40	0.004	0.26	0.05	9.1	31.29	5.09	13	15
07/21/86	12:20	0.004	0.50	0.07	5.1	19.70	4.40	11	20
08/18/86	12:30	0.006	0.43	0.11	4.2	18.43	3.50	12	21
09/23/86	11:00	0.030	1.18	0.84	9.2	61.00	9.30	121	102
10/15/86	10:45	0.008	1.55	0.24	8.1	40.00	6.67	32	51
11/18/86	11:00	0.004K	0.74	0.09	3.9	26.30	4.82	19	27
12/09/86	10:30	0.004K	0.52	0.05	5.0	19.17	4.21	13	23
01/13/87	11:30	0.008	1.35	0.22	3.5	33.52	4.91	36	39
02/26/87	11:15	0.004	2.64	0.38	9.6	35.48	6.62	78	52
03/24/87	11:15	0.004	0.54	0.06	4.4	17.27	3.69	13	21
04/28/87	11:05	0.004	0.50	0.07	8.6	22.02	4.55	14	32
05/20/87	11:30	0.006	1.25	0.08	2.6	39.21	7.02	38	28
06/10/87	13:40	0.010	0.57	0.16	3.0	32.93	6.83	21	22
07/20/87	14:30	0.024	1.02	0.40	7.1	42.90	8.56	50	36
08/18/87	12:20	0.060	1.43	0.25	3.3	48.12	8.57	66	46
09/15/87	10:00	0.004K	0.72	0.10	2.4	27.97	5.77	20	24
	MAXIMUM	0.060	2.64	0.84	9.6	61.00	9.30	121	102
	MINIMUM	0.004K	0.26	0.05	1.7	17.27	3.50	11	10
	AVERAGE	0.011	0.88	0.18	5.4	31.02	5.74	32	32

TABLE A-5 (continued)

MONITORING RESULTS FROM CAYT 1.7, CAYUTA CREEK AT WAVERLY, NEW YORK

DATE	TIME	Total Iron mg/1	Total Manganese mg/1	Total Aluminum mg/1	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/15/86	11:30	2.10*	0.05K	0.15K	520*	1000
05/27/86	13:30	2.35*	0.05	0.15	200	100
06/23/86	13:40	1.78*	0.05K	0.15K	60	100
07/21/86	12:20	2.27*	0.05K	0.40	850*	550
08/18/86	12:30	2.57*	0.05K	0.79	500*	340
09/23/86	11:00	1.54*	0.05K	0.15	3700*	460
10/15/86	10:45	1.87*	0.05K	0.15K	160	20
11/18/86	11:00	2.02*	0.05	0.15K	20	80
12/09/86	10:30	2.42*	0.05K	0.15K	400*	340
01/13/87	11:30	2.86*	0.05K	0.15K	220*	1400
02/26/87	11:15	1.87*	0.05K	0.15K	120	300
03/24/87	11:15	2.40*	0.05	0.47	20K	20K
04/28/87	11:05	2.65*	0.05K	0.15K	20	20
05/20/87	11:30	2.72*	0.05K	0.15K	80	80
06/10/87	13:40	2.17*	0.05K	0.15K	1000*	400
07/20/87	14:30	2.40*	0.05K	0.15K	520*	850
08/18/87	12:20	2.07*	0.05K	0.37	220*	100
09/15/87	10:00	3.00*	0.05K	0.15K	60	200
	MAXIMUM	3.00	0.05	0.79	3700	1400
	MINIMUM	1.54	0.05K	0.00	20K	20K
	AVERAGE	2.28	0.01	0.13	481	352

TABLE A-5

MONITORING RESULTS FROM CHEM 12.0, CHEMUNG RIVER AT CHEMUNG, NEW YORK

DATE	TIME	Flow cfs	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/l	pH S.U.	Alkalinity mg/l	Alkalinity tons/day	Acidity mg/l	Acidity tons/day	Turbidity J.T.U.
04/15/86	12:00	2530	10.0	230	-	8.50	60.0	410	0.0	0	5
05/27/86	13:30	1260	22.0	290	9.3	-	-	-	-	-	5
06/23/86	13:40	1420	21.0	290	7.8	7.80	88.0	337	-	-	10
07/21/86	13:10	4390	22.0	260	7.9	-	-	-	-	-	90*
08/18/86	13:00	867	25.0	360	9.0	8.40	114.0	267	0.0	0	-
09/23/86	12:00	289	17.0	500	8.2	-	-	-	-	-	5
10/15/86	11:15	755	12.0	365	10.2	8.40	110.0	224	0.0	0	-
11/18/86	11:25	1060	4.0	280	13.60	-	-	-	-	-	0
12/09/86	11:00	3450	2.0	220	13.2	7.70	54.0	503	3.0	28	5
01/13/87	11:55	1360	-	280	-	8.00	74.0	272	12.0	44	5
02/26/87	11:35	659	1.0	-	15.0	-	-	-	-	-	-
03/24/87	11:40	1820	8.0	250	14.4	8.10	60.0	295	4.0	20	5
04/28/87	11:35	2490	-	220	-	7.40	67.0	450	3.0	20	5
05/20/87	11:55	1040	14.0	330	9.3	7.75	94.0	264	8.0	22	5
06/10/87	14:00	964	20.0	320	9.5	7.40	90.0	234	18.0	47	5
07/20/87	15:30	869	29.0	250	9.0	7.90	108.0	253	8.0	19	5
08/18/87	12:45	255	28.0	420	9.5	7.80	122.0	84	12.0	8	10
09/15/87	09:30	4190	17.0	108	8.7	7.40	70.0	792	8.0	91	1000*
	MAXIMUM	4390	29.0	500	15.0	8.50	122.0	792	18.0	91	1000
	MINIMUM	255	1.0	108	7.8	7.40	54.0	84	0.0	0	0
	AVERAGE	1648	15.8	293	10.3	7.89	85.5	337	6.3	25	77

DATE	TIME	Biological Oxygen Demand mg/l	Biological Oxygen Demand tons/day	Total Ammonia as Nitrogen mg/l	Total Ammonia as Nitrogen tons/day	Total Nitrite as Nitrogen mg/l	Total Nitrite as Nitrogen tons/day	Total Nitrate as Nitrogen mg/l	Total Nitrate as Nitrogen tons/day	Total Phosphorus mg/l	Total Phosphorus tons/day
04/15/86	12:00	1.6	11	0.08	1	0.020	0	0.48	3	0.11	1
05/27/86	13:30	2.8	10	0.16	1	0.034	0	0.57	2	0.11	0
06/23/86	13:40	1.5	6	0.03	0	0.028	0	0.77	3	0.12	0
07/21/86	13:10	1.0	12	0.34	4	0.004	0	0.06	1	0.67	8
08/18/86	13:00	0.8	2	0.05	0	0.020	0	0.50	1	0.11	0
09/23/86	12:00	2.4	2	0.12	0	0.052	0	1.10	1	0.17	0
10/15/86	11:15	1.6	3	0.07	0	0.030	0	0.73	1	0.12	0
11/18/86	11:25	0.4	1	0.13	0	0.012	0	0.65	2	0.02	0
12/09/86	11:00	1.2	11	0.08	1	0.006	0	0.87	8	0.06	1
01/13/87	11:55	1.2	4	0.19	1	0.010	0	0.93	3	0.05	0
02/26/87	11:35	1.2	2	0.21	0	0.016	0	0.96	2	0.06	0
03/24/87	11:40	1.5	7	0.10	0	0.010	0	0.95	5	0.05	0
04/28/87	11:35	1.6	11	0.06	0	0.012	0	0.53	4	0.06	0
05/20/87	11:55	4.8	13	0.16	0	0.040	0	0.62	2	0.09	0
06/10/87	14:00	4.0	10	0.17	0	0.036	0	0.66	2	0.17	0
07/20/87	15:30	2.8	7	0.06	0	0.016	0	0.46	1	0.12	0
08/18/87	12:45	7.6	5	0.15	0	0.016	0	0.66	0	0.17	0
09/15/87	09:30	3.5	40	0.18	2	0.040	0	0.82	9	0.45	5
	MAXIMUM	7.6	40	0.34	4	0.052	0	1.10	9	0.67	8
	MINIMUM	0.4	1	0.03	0	0.004	0	0.06	0	0.02	0
	AVERAGE	2.3	9	0.13	1	0.022	0	0.68	3	0.15	1

TABLE A-6 (continued)

MONITORING RESULTS FROM CHEM 12.0, CHEMUNG RIVER AT CHEMUNG, NEW YORK

DATE	TIME	Total Organic Carbon mg/l	Total Organic Carbon tons/day	Total Calcium mg/l	Total Calcium tons/day	Total Magnesium mg/l	Total Magnesium tons/day	Total Chloride mg/l	Total Chloride tons/day	Total Sulfate mg/l	Total Sulfate tons/day
04/15/86	12:00	3.2	22	26.60	182	6.00	41	16	109	27	184
05/27/86	13:30	10.2	35	35.08	119	7.00	24	21	71	23	78
06/23/86	13:40	9.3	36	36.83	141	7.71	30	20	77	28	107
07/21/86	13:10	7.3	87	0.50	6	1.00	12	14	166	31	367
08/18/86	13:00	6.9	16	36.07	84	7.80	18	26	61	27	63
09/23/86	12:00	8.2	6	45.46	35	11.58	9	44	34	40	31
10/15/86	11:15	9.1	19	39.60	81	9.01	18	28	57	47	96
11/18/86	11:25	6.0	17	34.50	99	7.97	23	22	63	41	117
12/09/86	11:00	5.2	48	22.95	214	5.48	51	14	130	27	252
01/13/87	11:55	1.4	5	34.17	125	6.72	25	22	81	37	136
02/26/87	11:35	10.2	18	28.32	50	8.53	15	32	57	37	66
03/24/87	11:40	7.4	36	27.12	133	6.33	31	17	84	28	138
04/28/87	11:35	10.6	71	25.33	170	5.94	40	16	108	37	249
05/20/87	11:55	3.1	9	41.78	117	8.83	25	28	79	32	90
06/10/87	14:00	4.8	12	37.65	98	8.68	23	23	60	34	88
07/20/87	15:30	8.0	19	36.63	86	9.17	22	31	73	32	75
08/18/87	12:45	7.4	5	46.86	32	11.73	8	46	32	38	26
09/15/87	09:30	5.6	63	27.61	312	6.99	79	16	181	22	249
	MAXIMUM	10.6	87	46.86	312	11.73	79	46	181	47	367
	MINIMUM	1.4	5	0.50	6	1.00	8	14	32	22	26
	AVERAGE	6.9	29	32.39	116	7.58	27	24	85	33	134

DATE	TIME	Total Iron mg/l	Total Iron tons/day	Total Manganese mg/l	Total Manganese tons/day	Total Aluminum mg/l	Total Aluminum tons/day	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/15/86	12:00	1.91*	13	0.09	1	0.15K	0	2000*	280
05/27/86	13:30	2.94*	10	0.07	0	0.15K	0	950*	20
06/23/86	13:40	2.12*	8	0.07	0	0.50	0	780*	20
07/21/86	13:10	0.10	1	0.05	1	0.15K	0	5700*	51000
08/18/86	13:00	2.09*	5	0.08	0	0.15K	0	1900*	200
09/23/86	12:00	1.96*	2	0.08	0	0.25	0	300	160
10/15/86	11:15	3.49*	7	0.11	0	1.14	1	320	100
11/18/86	11:25	2.12*	6	0.12	0	0.15K	0	120	20K
12/09/86	11:00	2.17*	20	0.10	1	0.30	0	1500*	340
01/13/87	11:55	1.85*	7	0.09	0	0.16	0	20	60
02/26/87	11:35	1.89*	3	0.12	0	0.15K	0	20K	20K
03/24/87	11:40	1.81*	9	0.11	1	0.15K	0	20K	20K
04/28/87	11:35	2.57*	17	0.05	0	0.20	0	100	20
05/20/87	11:55	2.63*	7	0.08	0	0.15K	0	320*	60
06/10/87	14:00	2.11*	5	0.07	0	0.42	0	60	40
07/20/87	15:30	2.68*	6	0.10	0	0.35	0	100	20
08/18/87	12:45	2.40*	2	0.14	0	0.40	0	160	60
09/15/87	09:30	13.60*	154	0.40	5	6.10	2	3700*	7400
	MAXIMUM	13.60	154	0.40	5	6.10	2	5700	51000
	MINIMUM	0.10	1	0.05	0	0.15K	0	20K	20K
	AVERAGE	2.80	16	0.11	1	0.55	0	1002	3321

TABLE A-7

MONITORING RESULTS FROM TIOG 10.8, TIOGA RIVER AT LINDLEY, NEW YORK

DATE	TIME	Flow cfs	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/l	pH S.U.	Alkalinity mg/l	Alkalinity tons/day	Acidity mg/l	Acidity tons/day	Turbidity J.T.U.
04/15/86	14:00	552	8.0	190	-	7.10	28.0	42	3.0	4	5
05/27/86	15:15	234	20.5	165	9.5	-	-	-	-	-	0
06/23/86	15:10	237	23.0	195	8.6	6.90	30.0	19	-	-	0
07/21/86	14:20	583	22.0	220	8.3	-	-	-	-	-	5
08/18/86	13:30	172	24.0	250	8.5	7.50	24.0	11	3.0	1	-
09/23/86	13:20	85	17.0	330	10.2	-	-	-	-	-	0
10/15/86	13:15	219	12.0	265	-	-	-	-	-	-	-
11/18/86	12:45	343	5.0	240	12.4	-	-	-	-	-	5
12/09/86	12:15	1210	2.0	150	13.6	7.40	26.0	85	4.0	13	9
01/13/87	13:40	402	-	190	-	7.65	25.0	27	16.0	17	5
02/26/87	13:00	208	-	-	-	-	-	-	-	-	-
03/24/87	13:05	530	5.0	165	15.6	7.10	22.0	31	6.0	9	0
04/28/87	13:15	906	-	165	-	6.70	28.0	68	8.0	20	5
05/20/87	13:40	209	13.0	175	10.3	7.40	33.0	19	6.0	3	5
06/10/87	15:15	297	20.0	160	9.7	7.50	36.0	29	10.0	8	5
07/20/87	16:50	150	28.0	300	8.7	7.50	46.0	19	9.0	4	5
08/18/87	14:20	78	26.5	225	8.0	7.50	50.0	11	4.0	1	0
09/15/87	08:00	167	16.0	120	8.6	7.30	67.0	30	12.0	5	5
	MAXIMUM	1210	28.0	330	15.6	7.65	67.0	85	16.0	20	9
	MINIMUM	78	2.0	120	8.0	6.70	22.0	11	3.0	1	0
	AVERAGE	366	16.1	206	10.2	7.30	34.6	33	7.4	8	4

DATE	TIME	Biological Oxygen Demand mg/l	Biological Oxygen Demand tons/day	Total Ammonia as Nitrogen mg/l	Total Ammonia as Nitrogen tons/day	Total Nitrite as Nitrogen mg/l	Total Nitrite as Nitrogen tons/day	Total Nitrate as Nitrogen mg/l	Total Nitrate as Nitrogen tons/day	Total Phosphorus mg/l	Total Phosphorus tons/day
04/15/86	14:00	1.6	2	0.08	0	0.012	0	0.59	1	0.07	0
05/27/86	15:15	0.4	0	0.10	0	0.004	0	0.42	0	0.06	0
06/23/86	15:10	0.5	0	0.03	0	0.006	0	0.49	0	0.05	0
07/21/86	14:20	0.8	1	0.09	0	0.010	0	0.31	0	0.03	0
08/18/86	13:30	2.4	1	0.14	0	0.016	0	1.34	1	0.05	0
09/23/86	13:20	2.0	0	0.05	0	0.004	0	0.46	0	0.03	0
10/15/86	13:15	1.2	1	0.02K	0	0.010	0	0.31	0	0.04	0
11/18/86	12:45	0.4	0	0.07	0	0.004	0	0.38	0	0.04	0
12/09/86	12:15	0.4	1	0.05	0	0.004	0	0.74	2	0.06	0
01/13/87	13:40	0.8	1	0.07	0	0.004K	0	0.80	1	0.02	0
02/26/87	13:00	0.8	0	0.13	0	0.004	0	0.84	0	0.02	0
03/24/87	13:05	0.5	1	0.10	0	0.008	0	0.93	1	0.03	0
04/28/87	13:15	2.0	5	0.06	0	0.006	0	0.61	1	0.04	0
05/20/87	13:40	2.8	2	0.09	0	0.008	0	0.47	0	0.03	0
06/10/87	15:15	3.2	3	0.14	0	0.008	0	0.45	0	0.11	0
07/20/87	16:50	3.5	1	0.11	0	0.008	0	0.43	0	0.05	0
08/18/87	14:20	4.8	1	0.13	0	0.004	0	0.40	0	0.05	0
09/15/87	08:00	4.8	2	0.10	0	0.006	0	0.26	0	0.16	0
	MAXIMUM	4.8	5	0.14	0	0.016	0	1.34	2	0.16	0
	MINIMUM	0.4	0	0.02K	0	0.004K	0	0.26	0	0.02	0
	AVERAGE	1.8	1	0.09	0	0.007	0	0.57	1	0.05	0

TABLE A-7 (continued)

MONITORING RESULTS FROM TIOG 10.8, TIOGA RIVER AT LINDLEY, NEW YORK

DATE	TIME	Total Organic Carbon mg/l	Total Organic Carbon tons/day	Total Calcium mg/l	Total Calcium tons/day	Total Magnesium mg/l	Total Magnesium tons/day	Total Chloride mg/l	Total Chloride tons/day	Total Sulfate mg/l	Total Sulfate tons/day
04/15/86	14:00	2.6	4	18.40	27	5.37	8	8	12	41	61
05/27/86	15:15	3.8	2	19.84	13	5.18	3	8	5	39	25
06/23/86	15:10	4.8	3	21.24	14	5.75	4	11	7	41	26
07/21/86	14:20	4.3	7	23.36	37	6.37	10	10	16	45	71
08/18/86	13:30	5.7	3	25.43	12	7.45	3	16	7	61	28
09/23/86	13:20	3.4	1	30.48	7	10.75	2	11	3	90	21
10/15/86	13:15	5.7	3	26.70	16	7.15	4	14	8	59	35
11/18/86	12:45	2.6	2	23.80	22	7.55	7	9	8	70	65
12/09/86	12:15	3.8	12	15.21	50	3.63	12	7	23	32	105
01/13/87	13:40	1.8	2	21.22	23	4.94	5	8	9	49	53
02/26/87	13:00	4.6	3	15.99	9	6.08	3	10	6	53	30
03/24/87	13:05	5.5	8	15.97	23	4.86	7	7	10	39	56
04/28/87	13:15	5.0	12	16.15	40	4.44	11	6	15	44	108
05/20/87	13:40	2.2	1	21.32	12	5.23	3	10	6	38	21
06/10/87	15:15	1.4	1	22.70	18	5.80	5	11	9	43	34
07/20/87	16:50	8.8	4	21.87	9	5.60	2	12	5	12	5
08/18/87	14:20	6.7	1	28.43	6	6.98	1	11	2	58	12
09/15/87	08:00	5.0	2	27.71	12	6.70	3	19	9	34	15
	MAXIMUM	8.8	12	30.48	50	10.75	12	19	23	90	108
	MINIMUM	1.4	1	15.21	6	3.63	1	6	2	12	5
	AVERAGE	4.3	4	21.99	19	6.10	5	10	9	47	43

DATE	TIME	Total Iron mg/l	Total Iron tons/day	Total Manganese mg/l	Total Manganese tons/day	Total Aluminum mg/l	Total Aluminum tons/day	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/15/86	14:00	2.36	4	0.81	1	0.21	0	20	20
05/27/86	15:15	2.38	2	0.43	0	0.43	0	160	20
06/23/86	15:10	1.66	1	0.29	0	0.15K	0	160	40
07/21/86	14:20	2.01	3	0.24	0	0.15K	0	300*	180
08/18/86	13:30	2.61	1	0.12	0	0.15K	0	100	100
09/23/86	13:20	2.01	0	0.55	0	0.15K	0	320*	80
10/15/86	13:15	2.25	1	0.41	0	0.15K	0	5100*	20
11/18/86	12:45	1.62	2	1.15	1	0.15K	0	80	60
12/09/86	12:15	2.78	9	0.38	1	0.59	2	240*	1200
01/13/87	13:40	2.14	2	0.63	1	0.23	0	40	20K
02/26/87	13:00	2.04	1	0.92	1	0.15K	0	20K	20K
03/24/87	13:05	1.95	3	0.70	1	0.28	0	20K	20K
04/28/87	13:15	2.72	7	0.52	1	0.21	1	40	40
05/20/87	13:40	2.71	2	0.19	0	0.15K	0	140	20
06/10/87	15:15	2.12	2	0.24	0	0.15K	0	20	20
07/20/87	16:50	2.43	1	0.10	0	0.52	0	220*	100
08/18/87	14:20	2.29	0	0.13	0	0.15	0	340*	20
09/15/87	08:00	2.49	1	0.17	0	0.15K	0	720*	3600
	MAXIMUM	2.78	9	1.15	1	0.59	2	5100	3600
	MINIMUM	1.62	0	0.10	0	0.15K	0	20K	20K
	AVERAGE	2.25	2	0.44	0	0.15	0	444	307

TABLE A-8

MONITORING RESULTS FROM SEEL 10.3, SEELEY CREEK NEAR SEELEY CREEK, NEW YORK

DATE	TIME	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/l	pH S.U.	Alkalinity mg/l	Acidity mg/l	Turbidity J.T.U.	Biological Oxygen Demand mg/l	Total Ammonia as Nitrogen mg/l
04/15/86	13:10	8.0	200	-	8.0	70	2	0	0.4	0.02
05/27/86	14:30	19.0	220	9.2	-	-	-	0	2.8	0.27
06/23/86	14:35	19.5	285	8.5	8.0	98		0	1.0	0.03
07/21/86	13:45	21.0	250	9.0	-	-	-	0	0.4	0.04
08/18/86	13:30	22.0	255	9.0	8.1	104	-	1	0.4	0.05
09/23/86	12:40	16.0	320	8.9	-	-	-	0	0.8	0.07
10/15/86	12:30	11.5	255	11.4	-	-	-	-	0.4	0.02K
11/18/86	12:05	5.0	190	13.0	-	-	-	5	0.4K	0.02
12/09/86	11:40	3.0	160	13.1	7.8	44	2	2	0.8	0.03
01/13/87	13:00	-	180		8.2	50	2	0	1.2	0.03
02/26/87	12:15	-	-	-	-	-	-	-	0.8	0.03
03/24/87	12:20	8.0	170	13.4	7.7	46	4	0	0.5	0.06
04/28/87	12:30	-	175	-	7.6	57	12	0	2.4	0.06
05/20/87	12:55	12.0	220	10.6	8.0	86	3	0	2.8	0.06
06/10/87	14:40	19.0	220	9.1	7.5	70	12	5	2.8	0.12
07/20/87	16:15	25.0	480	8.5	7.8	106	8	0	0.8	0.06
08/18/87	13:30	22.0	280	7.6	7.7	134	12	0	3.2	0.09
09/15/87	08:45	14.0	124	9.0	7.7	112	8	0	1.2	0.02
	MAXIMUM	25.0	480	13.4	8.2	134	12	5	3.2	0.27
	MINIMUM	3.0	124	7.6	7.5	44	1	0	0.4K	0.02K
	AVERAGE	15.0	234	10.0	7.8	81	6	1	1.3	0.06

DATE	TIME	Total Nitrite as Nitrogen mg/l	Total Nitrate as Nitrogen mg/l	Total Phosphorus mg/l	Total Organic Carbon mg/l	Total Calcium mg/l	Total Magnesium mg/l	Total Chloride mg/l	Total Sulfate mg/l
04/15/86	13:10	0.010	0.43	0.06	2.9	27.40	4.62	8	16
05/27/86	14:30	0.004	0.34	0.07	7.3	29.78	4.56	10	10
06/23/86	14:35	0.004	0.28	0.05	11.2	39.57	6.16	11	17
07/21/86	13:45	0.004	0.18	0.02	4.1	31.10	4.96	10	13
08/18/86	13:30	0.004	0.28	0.04	4.4	33.83	4.75	15	20
09/23/86	12:40	0.004	0.30	0.03	8.1	43.37	6.82	11	22
10/15/86	12:30	0.004	0.22	0.02	5.3	29.74	5.04	13	35
11/18/86	12:05	0.004K	0.52	0.04	4.8	25.70	4.24	9	27
12/09/86	11:40	0.004K	0.76	0.03	4.5	19.04	3.15	7	24
01/13/87	13:00	0.004K	0.62	0.02	2.8	26.59	4.03	8	29
02/26/87	12:15	0.004K	0.68	0.03	6.7	20.05	4.90	10	25
03/24/87	12:20	0.004	0.60	0.02	10.0	20.01	3.52	8	22
04/28/87	12:30	0.004K	0.26	0.04	8.6	20.02	3.60	6	29
05/20/87	12:55	0.004K	0.44	0.03	1.3	33.21	5.46	10	19
06/10/87	14:40	0.004	0.30	0.11	3.8	29.89	5.11	8	16
07/20/87	16:15	0.004	0.26	0.04	4.3	34.47	6.28	11	22
08/18/87	13:30	0.004K	0.30	0.02K	2.2	46.48	7.09	11	21
09/15/87	08:45	0.004K	0.40	0.04	1.0K	39.43	6.51	12	17
	MAXIMUM	0.010	0.76	0.11	11.2	46.48	7.09	15	35
	MINIMUM	0.004K	0.18	0.02K	1.0K	19.04	3.15	6	10
	AVERAGE	0.003	0.40	0.04	5.1	30.54	5.04	10	21

TABLE A-8 (continued)

MONITORING RESULTS FROM SEEL 10.3, SEELEY CREEK NEAR SEELEY CREEK, NEW YORK

DATE	TIME	Total Iron mg/l	Total Manganese mg/l	Total Aluminum mg/l	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/15/86	13:10	2.42	0.05K	0.54*	20	20
05/27/86	14:30	2.59	0.05K	0.15K	20	100
06/23/86	14:35	1.69	0.05K	0.15K	60	20
07/21/86	13:45	1.71	0.05K	0.15K	180	20
S08/18/86	13:30	2.09	0.05K	0.15K	20	40
09/23/86	12:40	1.84	0.05K	0.15K	950*	700
10/15/86	12:30	1.76	0.05K	0.15K	40	80
11/18/86	12:05	1.51	0.06	0.15K	40	60
12/09/86	11:40	2.30	0.05K	0.15K	200	720
01/13/87	13:00	1.84	0.05K	0.15K	20	20K
02/26/87	12:15	1.84	0.05K	0.15K	20K	20K
03/24/87	12:20	1.82	0.05K	0.15K	20	20K
04/28/87	12:30	2.42	0.05K	0.25	80	20K
05/20/87	12:55	2.60	0.05K	0.15K	20	20
06/10/87	14:40	1.92	0.05K	0.15K	40	160
07/20/87	16:15	2.54	0.05K	0.15K	40	240
08/18/87	13:30	2.26	0.05K	0.15K	200	260
09/15/87	08:45	2.29	0.05K	0.15K	40	180
	MAXIMUM	2.60	0.06	0.54	950	720
	MINIMUM	1.51	0.05K	0.15K	20K	20K
	AVERAGE	2.08	0.00	0.04	111	146

TABLE A-9

MONITORING RESULTS FROM SUSQ 44.5, SUSQUEHANNA RIVER AT COLUMBIA, PENNSYLVANIA

DATE	TIME	Flow cfs	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/l	pH S.U.	Alkalinity mg/l	Alkalinity tons/day	Acidity mg/l	Acidity tons/day	Turbidity J.T.U.
04/14/86	13:30	31100	-	-	-	8.00	36.0	3023	1.0	84	10
05/29/86	08:30	26800	22.0	186	9.3	8.00	35.0	2533	1.0	72	15
06/23/86	07:30	22700	24.0	220	7.6	7.90	-	-	2.0	123	5
07/22/86	10:00	27900	25.9	278	-	8.20	58.0	4369	1.0	75	10
08/26/86	11:00	11800	22.6	256	9.2	8.75*	58.0	1848	8.0	255	10
09/16/86	10:00	6040	21.8	430	7.5	8.20	72.0	1174	2.0	33	20
10/23/86	10:30	11400	15.0	300	10.6	8.40	58.0	1785	0.0	0	5
11/25/86	10:00	67700	6.0	160	11.6	7.50	48.0	8774	4.0	731	10
12/15/86	11:00	50000	4.0	180	14.8	7.55	34.0	4590	4.0	540	5
01/12/87	10:30	25300	4.0	237	13.6	8.90*	-	-	-	-	10
02/20/97	12:45	16800	5.0	280	11.8	8.40	-	-	-	-	0
03/18/87	-	41900	-	180	-	7.30	26.0	2941	4.0	453	0
04/29/87	13:45	38400	15.5	225	11.6	6.90	40.0	4147	12.0	1244	10
05/21/87	13:30	26700	19.0	220	10.1	7.45	46.0	3316	8.0	577	5
06/17/87	10:50	18300	27.0	240	8.4	7.60	60.0	2965	10.0	494	5
07/21/87	10:25	13300	30.0	360	7.6	7.70	48.0	1724	8.0	287	5
08/20/87	13:00	5480	28.0	345	8.3	8.00	49.0	725	2.0	30	5
09/16/87	14:20	44900	23.0	94	8.6	7.10	30.0	3637	9.0	1091	25
	MAXIMUM	67700	30.0	430	14.8	8.90	72.0	8774	12.0	1244	25
	MINIMUM	5480	4.0	94	7.5	6.90	26.0	725	0.0	0	0
	AVERAGE	27029	18.3	247	10.0	7.88	46.5	3170	4.8	381	9

DATE	TIME	Biological Oxygen Demand mg/l	Biological Oxygen Demand tons/day	Total Ammonia as Nitrogen mg/l	Total Ammonia as Nitrogen tons/day	Total Nitrite as Nitrogen mg/l	Total Nitrite as Nitrogen tons/day	Total Nitrate as Nitrogen mg/l	Total Nitrate as Nitrogen tons/day	Total Phosphorus mg/l	Total Phosphorus tons/day
04/14/86	13:30	1.6	134	0.04	3	0.006	1	0.89	75	0.11	9
05/29/86	08:30	2.4	174	0.08	6	0.012	1	0.79	57	0.09	7
06/23/86	07:30	1.5	92	0.05	3	0.010	1	0.63	39	0.10	6
07/22/86	10:00	1.2	90	0.09	7	0.012	1	0.63	47	0.13	10
08/26/86	11:00	0.4K	0	0.07	2	0.018	1	0.48	15	0.06	2
09/16/86	10:00	4.5	73	2.42*	39	0.016	0	1.08	18	0.09	1
10/23/86	10:30	2.4	74	0.05	2	0.008	0	0.79	24	0.07	2
11/25/86	10:00	1.6	292	0.07	13	0.008	1	1.47	269	0.17	31
12/15/86	11:00	1.2	162	0.11	15	0.008	1	1.43	193	0.05	7
01/12/87	10:30	0.4K	0	0.14	10	0.016	1	1.78	122	0.05	3
02/20/97	12:45	2.0	91	0.08	4	0.014	1	1.80	82	0.05	2
03/18/87	-	0.8	91	0.05	6	0.012	1	1.27	144	0.05	6
04/29/87	13:45	5.6	581	0.16	17	0.026	3	1.01	105	0.08	8
05/21/87	13:30	2.8	202	0.10	7	0.012	1	0.83	60	0.07	5
06/17/87	10:50	2.5	124	0.04	2	0.012	1	0.57	28	0.16	8
07/21/87	10:25	6.4	230	0.13	5	0.008	0	0.67	24	0.06	2
08/20/87	13:00	0.4K	0	0.13	2	0.004K	0	4.10	61	0.09	1
09/16/87	14:20	4.5	546	0.17	21	0.018	2	1.88	228	0.17	21
	MAXIMUM	6.4	581	2.42	39	0.026	3	4.10	269	0.17	31
	MINIMUM	0.4K	0	0.04	2	0.004K	0	0.48	15	0.05	1
	AVERAGE	2.3	164	0.22	9	0.012	1	1.23	88	0.09	7

TABLE A-9 (continued)

MONITORING RESULTS FROM SUSQ 44.5, SUSQUEHANNA RIVER AT COLUMBIA, PENNSYLVANIA

DATE	TIME	Total Organic Carbon mg/l	Total Organic Carbon tons/day	Total Calcium mg/l	Total Calcium tons/day	Total Magnesium mg/l	Total Magnesium tons/day	Total Chloride mg/l	Total Chloride tons/day	Total Sulfate mg/l	Total Sulfate tons/day
04/14/86	13:30	2.9	244	22.00	1847	6.23	523	8	672	50	4199
05/29/86	08:30	3.7	268	19.31	1397	5.31	384	9	651	30	2171
06/23/86	07:30	7.0	429	22.10	1355	5.67	348	10	613	40	2452
07/22/86	10:00	5.5	414	30.49	2297	9.25	697	15	1130	59	4444
08/26/86	11:00	6.4	204	27.20	867	8.53	272	15	478	42	1338
09/16/86	10:00	7.9	129	42.00	685	11.90	194	25	408	92	1500
10/23/86	10:30	4.4	135	30.83	949	8.58	264	15	462	132	4063
11/25/86	10:00	3.4	621	17.25	3153	4.57	835	10	1828	28	5118
12/15/86	11:00	4.4	594	19.92	2689	5.38	726	11	1485	34	4590
01/12/87	10:30	1.3	89	27.98	1911	7.09	484	15	1025	52	3552
02/20/97	12:45	5.1	231	30.52	1384	8.24	374	19	862	108	4899
03/18/87	-	4.7	532	20.12	2276	5.11	578	10	1131	28	3168
04/29/87	13:45	7.3	757	20.79	2156	6.53	677	8	829	45	4666
05/21/87	13:30	2.9	209	27.27	1966	7.82	564	11	793	53	3821
06/17/87	10:50	4.5	222	26.65	1317	7.95	393	17	840	61	3014
07/21/87	10:25	5.7	205	23.32	837	7.91	284	14	503	55	1975
08/20/87	13:00	5.0	74	39.14	579	13.57	201	21	311	13	192
09/16/87	14:20	4.7	570	20.40	2473	7.35	891	11	1334	52	6304
	MAXIMUM	7.9	757	42.00	3153	13.57	891	25	1828	132	6304
	MINIMUM	1.3	74	17.25	579	4.57	194	8	311	13	192
	AVERAGE	4.8	329	25.96	1674	7.61	483	14	853	54	3415

DATE	TIME	Total Iron mg/l	Total Iron tons/day	Total Manganese mg/l	Total Manganese tons/day	Total Aluminum mg/l	Total Aluminum tons/day	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/14/86	13:30	2.84*	238	0.21	18	0.15K	0	20	20
05/29/86	08:30	3.35*	242	0.12	9	0.48	35	300*	200
06/23/86	07:30	2.65*	162	0.09	6	0.45	28	40	60
07/22/86	10:00	1.65*	124	0.09	7	0.47	35	360*	460
08/26/86	11:00	2.60*	83	0.10	3	0.37	12	40	520
09/16/86	10:00	2.71*	44	1.44*	23	0.33	5	260*	580
10/23/86	10:30	3.33*	102	0.06	2	0.18	6	220*	200
11/25/86	10:00	5.45*	996	0.46*	84	2.31	422	-	-
12/15/86	11:00	2.40*	324	0.22	30	0.43	58	40	140
01/12/87	10:30	2.41*	165	0.21	14	0.30	20	160	80
02/20/97	12:45	2.25*	102	0.17	8	0.15K	0	-	-
03/18/87	-	0.86	97	0.17	19	0.48	54	40	40
04/29/87	13:45	2.76*	286	0.17	18	0.35	36	20	20K
05/21/87	13:30	2.67*	192	0.08	6	0.15K	0	1000*	100
06/17/87	10:50	1.44	71	0.17	8	0.58	29	20	200
07/21/87	10:25	2.22*	80	0.08	3	0.15	5	240*	550
08/20/87	13:00	0.48	7	0.17	3	0.45	7	20K	380
09/16/87	14:20	3.54*	429	0.50*	61	1.86	225	1100*	400
	MAXIMUM	5.45	996	1.44	84	2.31	422	1100	580
	MINIMUM	0.48	7	0.06	2	0.15K	0	20K	20K
	AVERAGE	2.53	208	0.25	18	0.51	54	243	247

TABLE A-10

MONITORING RESULTS FROM SUSQ 4.8, SUSQUEHANNA RIVER AT LAPIDUM/PORT DEPOSIT, MARYLAND

DATE	TIME	Flow cfs	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/1	pH S.U.	Alkalinity mg/1	Alkalinity tons/day	Acidity mg/1	Acidity tons/day	Turbidity J.T.U.
05/29/86	12:18	26800	23.0	200	7.6	7.80	44.0	3184	2.0	145	5
06/23/86	13:30	28700	24.0	202	7.0	7.70	-	-	3.0	232	10
07/23/86	08:00	31600	26.4	305	-	7.30	54.0	4607	6.0	512	5
08/27/86	08:00	20400	23.5	260	5.6	7.75	50.0	2754	4.0	220	10
10/23/86	15:00	13200	16.5	290	9.5	7.80	58.0	2067	2.0	71	5
11/25/86	14:30	77800	6.5	195	12.4	7.80	32.0	6722	4.0	840	20
12/15/86	15:45	49900	5.0	196	14.0	7.55	36.0	4850	4.0	539	5
01/15/87	12:30	27400	5.0	220	14.2	7.65	41.0	3033	6.0	444	5
02/18/87	13:00	15600	3.0	225	12.6	-	-	-	-	-	5
03/25/87	12:00	36500	10.0	205	12.2	7.80	28.0	2759	16.0	1577	10
04/29/87	11:30	38600	16.5	230	10.6	6.70	48.0	5003	20.0	2084	10
05/21/87	10:30	31900	19.0	220	8.8	7.45	40.0	3445	6.0	517	5
06/17/87	14:15	18100	25.0	310	8.2	7.50	55.0	2688	6.0	293	5
07/21/87	12:40	15000	29.0	375	6.6	7.20	44.0	1782	10.0	405	5
08/20/87	10:15	4570	26.0	260	6.9	7.30	55.0	679	8.0	99	0
09/16/87	11:15	46800	24.0	116	8.4	7.40	48.0	6065	13.0	1643	15
	MAXIMUM	77800	29.0	375	14.2	7.80	58.0	6722	20.0	2084	20
	MINIMUM	4570	3.0	116	5.6	6.70	28.0	679	2.0	71	0
	AVERAGE	30179	17.7	238	9.6	7.51	45.1	3546	7.3	641	8

DATE	TIME	Biological Oxygen Demand mg/1	Biological Oxygen Demand tons/day	Total Ammonia as Nitrogen mg/1	Total Ammonia as Nitrogen tons/day	Total Nitrite as Nitrogen mg/1	Total Nitrite as Nitrogen tons/day	Total Nitrate as Nitrogen mg/1	Total Nitrate as Nitrogen tons/day	Total Phosphorus mg/1	Total Phosphorus tons/day
05/29/86	12:18	2.8	203	0.20	14	0.032	2	1.05	76	0.07	5
06/23/86	13:30	3.5	271	0.18	14	0.024	2	1.02	79	0.10	8
07/23/86	08:00	2.4	205	0.12	10	0.044	4	0.80	68	0.06	5
08/27/86	08:00	4.0	220	0.15	8	0.034	2	1.13	62	0.08	4
10/23/86	15:00	2.0	71	0.07	2	0.020	1	1.02	36	0.06	2
11/25/86	14:30	1.2	252	0.08	17	0.012	3	1.79	376	0.10	21
12/15/86	15:45	1.2	162	0.11	15	0.012	2	1.51	203	0.04	5
01/15/87	12:30	0.4	30	0.12	9	0.014	1	2.40	178	0.03	2
02/18/87	13:00	0.4	17	0.07	3	0.014	1	2.41	102	0.05	2
03/25/87	12:00	2.0	197	0.14	14	0.016	2	2.26	223	0.10	10
04/29/87	11:30	12.0	1251	0.40	42	0.090	9	2.99	312	0.09	9
05/21/87	10:30	3.2	276	0.19	16	0.022	2	0.92	79	0.07	6
06/17/87	14:15	3.2	156	0.14	7	0.070	3	1.07	52	0.10	5
07/21/87	12:40	6.4	259	0.21	9	0.022	1	1.22	49	0.05	2
08/20/87	10:15	2.8	35	0.18	2	0.012	0	0.81	10	0.05	1
09/16/87	11:15	6.5	821	0.21	27	0.030	4	1.50	190	0.14	18
	MAXIMUM	12.0	1251	0.40	42	0.090	9	2.99	376	0.14	21
	MINIMUM	0.4	17	0.07	2	0.012	0	0.80	10	0.03	1
	AVERAGE	3.4	277	0.16	13	0.029	2	1.49	131	0.07	7

TABLE A-10 (continued)

MONITORING RESULTS FROM SUSQ 4.8, SUSQUEHANNA RIVER AT LAPIDUM/PORT DEPOSIT, MARYLAND

DATE	TIME	Total Organic Carbon mg/l	Total Organic Carbon tons/day	Total Calcium mg/l	Total Calcium tons/day	Total Magnesium mg/l	Total Magnesium tons/day	Total Chloride mg/l	Total Chloride tons/day	Total Sulfate mg/l	Total Sulfate tons/day
05/29/86	12:18	4.3	311	21.28	1540	5.65	409	11	796	28	2026
06/23/86	13:30	7.3	566	19.79	1534	4.84	375	11	852	35	2712
07/23/86	08:00	5.3	452	31.64	2700	10.25	875	15	1280	71	6058
08/27/86	08:00	6.6	364	25.50	1405	7.57	417	16	881	37	2038
10/23/86	15:00	5.4	192	26.97	961	7.47	266	15	535	57	2031
11/25/86	14:30	4.8	1008	17.51	3678	4.77	1002	11	2311	36	7562
12/15/86	15:45	3.6	485	18.92	2549	5.08	684	10	1347	32	4311
01/15/87	12:30	2.6	192	22.75	1683	6.86	508	14	1036	42	3107
02/18/87	13:00	4.8	202	24.85	1047	7.01	295	16	674	34	1432
03/25/87	12:00	7.0	690	18.93	1866	6.07	598	11	1084	30	2957
04/29/87	11:30	12.2	1271	23.93	2494	6.42	669	11	1146	33	3439
05/21/87	10:30	3.5	301	25.17	2168	6.95	599	12	1034	61	5254
06/17/87	14:15	4.4	215	28.80	1407	8.53	417	15	733	54	2639
07/21/87	12:40	7.0	284	24.60	996	7.44	301	15	608	50	2025
08/20/87	10:15	4.7	58	29.80	368	9.62	119	18	222	65	802
09/16/87	11:15	6.0	758	25.02	3162	8.29	1048	17	2148	55	6950
	MAXIMUM	12.2	1271	31.64	3678	10.25	1048	18	2311	71	7562
	MINIMUM	2.6	58	17.51	368	4.77	119	10	222	28	802
	AVERAGE	5.6	459	24.09	1847	7.05	536	14	1043	45	3459

DATE	TIME	Total Iron mg/l	Total Iron tons/day	Total Manganese mg/l	Total Manganese tons/day	Total Aluminum mg/l	Total Aluminum tons/day	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
05/29/86	12:18	3.23	234	0.20	14	0.26	19	20	20
06/23/86	13:30	2.95	229	0.22	17	0.38	29	20	60
07/23/86	08:00	3.08	263	0.18	15	0.16	14	40	20
08/27/86	08:00	2.35	129	0.60	33	0.40	22	20	220
10/23/86	15:00	1.90	68	0.08	3	0.15K	0	20K	60
11/25/86	14:30	3.32	697	0.12	25	1.15	242	-	-
12/15/86	15:45	2.18	294	0.14	19	0.29	39	60	40
01/15/87	12:30	2.98	220	0.16	12	0.48	36	120	100
02/18/87	13:00	2.44	103	0.15	6	0.16	7	20K	20K
03/25/87	12:00	3.68	363	0.26	26	1.35	133	20	60
04/29/87	11:30	3.06	319	0.19	20	0.39	41	20K	20
05/21/87	10:30	2.76	238	0.17	15	0.19	16	100	100
06/17/87	14:15	1.41	69	0.19	9	0.37	18	20	40
07/21/87	12:40	2.35	95	0.12	5	0.15	6	20	40
08/20/87	10:15	2.26	28	0.12	1	0.21	3	20K	100
09/16/87	11:15	1.36	172	0.20	25	0.96	121	100	100
	MAXIMUM	3.68	697	0.60	33	1.35	242	120	220
	MINIMUM	1.36	28	0.08	1	0.15K	0	20K	20K
	AVERAGE	2.58	220	0.19	15	0.43	47	36	65

TABLE A-11

MONITORING RESULTS FROM CNWG 4.4, CONOWINGO CREEK AT PLEASANT GROVE, PENNSYLVANIA

DATE	TIME	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/l	pH S.U.	Alkalinity mg/l	Acidity mg/l	Turbidity J.T.U.	Biological Oxygen Demand mg/l	Total Ammonia as Nitrogen mg/l
05/29/86	11:00	21.5	180	7.9	7.7	32.0	3.0	15.0	2.4	0.18
06/25/86	07:00	18.5	185	5.7	7.6	-	3.0	20.0	1.0	0.06
07/22/86	12:30	24.0	254	-	7.3	46.0	4.0	100.0*	7.2	0.07
08/26/86	13:30	22.0	210	7.4	7.8	39.0	6.0	10.0	0.4	0.06
09/16/86	12:20	17.5	190	7.2	7.5	36.0	3.0	15.0	3.5	0.17
10/23/86	12:30	13.0	200	10.8	7.0	32.0	6.0	10.0	1.6	0.06
11/25/86	11:33	6.5	201	11.6	7.7	28.5	16.0	10.0	1.2	0.20
12/15/86	13:00	3.5	208	15.0	7.6	27.0	4.0	0.0	0.8	0.05
01/15/87	11:00	7.5	190	12.4	7.4	32.0	6.0	5.0	0.4	0.06
02/18/87	10:30	3.5	190	13.2	7.0	16.0	20.0	5.0	0.4	0.03
03/25/87	09:30	10.0	185	12.4	7.5	20.0	6.0	0.0	1.5	0.07
04/30/87	09:40	13.0	195	11.8	6.6	28.0	12.0	5.0	4.0	0.15
05/18/87	12:45	20.0	185	9.5	7.0	26.0	14.0	0.0	4.0	0.11
06/10/87	11:45	23.0	140	8.8	7.2	30.0	14.0	5.0	2.0	0.15
07/20/87	09:50	26.0	310	7.6	7.1	40.0	14.0	10.0	7.2	0.21
08/18/87	13:25	24.0	160	8.0	7.2	36.0	8.0	5.0	2.4	0.14
09/16/87	12:50	22.2	95	8.7	7.1	40.0	13.0	10.0	7.2	0.20
	MAXIMUM	26.0	310	15.0	7.8	46.0	20.0	100.0	7.2	0.21
	MINIMUM	3.5	95	5.7	6.6	16.0	3.0	0.0	0.4	0.03
	AVERAGE	16.2	193	9.9	7.3	31.8	8.9	13.2	2.8	0.12

DATE	TIME	Total Nitrite as Nitrogen mg/l	Total Nitrate as Nitrogen mg/l	Total Phosphorus mg/l	Total Organic Carbon mg/l	Total Calcium mg/l	Total Magnesium mg/l	Total Chloride mg/l	Total Sulfate mg/l
05/29/86	11:00	0.066	6.66	0.13	2.9	13.66	8.02	14	10K
06/25/86	07:00	0.036	6.26	0.13	2.6	13.31	7.72	15	10K
07/22/86	12:30	0.179	4.66	0.52	16.2	12.23	8.75	18	22
08/26/86	13:30	0.032	4.77	0.13	3.6	12.78	7.91	15	10K
09/16/86	12:20	0.018	6.80	0.12	6.1	14.03	6.73	17	15
10/23/86	12:30	0.018	7.24	0.09	3.3	12.34	6.89	14	29
11/25/86	11:33	0.030	7.01	0.21	5.1	13.41	8.05	15	28
12/15/86	13:00	0.016	8.34	0.05	2.5	13.95	7.95	15	15
01/15/87	11:00	0.020	7.46	0.07	2.7	13.97	8.33	15	88
02/18/87	10:30	0.024	6.80	0.06	2.9	12.80	7.59	14	10K
03/25/87	09:30	0.042	7.66	0.10	5.1	12.58	7.50	14	10K
04/30/87	09:40	0.044	7.66	0.08	6.5	12.59	7.92	13	22
05/18/87	12:45	0.042	6.78	0.06	3.7	13.41	7.54	15	10K
06/10/87	11:45	0.052	6.33	0.21	1.1	14.23	7.74	15	10K
07/20/87	09:50	0.046	5.50	0.15	6.9	14.34	8.59	18	37
08/18/87	13:25	0.028	5.70	0.13	2.5	14.26	7.88	15	10K
09/16/87	12:50	0.044	6.30	0.16	6.6	13.84	8.78	17	20
	MAXIMUM	0.179	8.34	0.52	16.2	14.34	8.78	18	88
	MINIMUM	0.016	4.66	0.05	1.1	12.23	6.73	13	10K
	AVERAGE	0.043	6.58	0.14	4.7	13.40	7.88	15	16

TABLE A-11 (continued)

MONITORING RESULTS FROM CNWG 4.4, CONOWINGO CREEK AT PLEASANT GROVE, PENNSYLVANIA

DATE	TIME	Total Iron mg/l	Total Manganese mg/l	Total Aluminum mg/l	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
05/29/86	11:00	3.74	0.10*	1.03	3900*	600
06/25/86	07:00	3.36	0.10*	0.96	1600*	800
07/22/86	12:30	6.60	0.19*	3.81	7500*	2400
08/26/86	13:30	3.93	0.12*	1.37	4200*	400
09/16/86	12:20	2.89	0.08*	0.23	900*	380
10/23/86	12:30	2.28	0.06*	0.40	900*	600
11/25/86	11:33	2.84	0.08*	0.30	-	-
12/15/86	13:00	1.61	0.07*	0.15K	360*	140
01/15/87	11:00	2.41	0.05	0.17	380*	520
02/18/87	10:30	2.52	0.08*	0.21	220*	140
03/25/87	09:30	2.65	0.07*	0.15K	220*	80
04/30/87	09:40	2.83	0.05	0.18	580*	100
05/18/87	12:45	3.54	0.10*	0.58	2100*	240
06/10/87	11:45	2.88	0.08*	0.90	180	60
07/20/87	09:50	2.71	0.10*	0.26	900*	820
08/18/87	13:25	3.08	0.13*	0.52	1200*	550
09/16/87	12:50	0.81	0.06*	0.35	3600*	750
	MAXIMUM	6.60	0.19	3.81	7500	2400
	MINIMUM	0.81	0.05	0.15K	180	60
	AVERAGE	2.98	0.09	0.66	1796	536

TABLE A-12

MONITORING RESULTS FROM OCTO 8.6, OCTORARO CREEK NEAR ROCK SPRINGS, MARYLAND

DATE	TIME	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/1	pH S.U.	Alkalinity mg/1	Acidity mg/1	Turbidity J.T.U.	Biological Oxygen Demand mg/1	Total Ammonia as Nitrogen mg/1
05/29/86	10:45	24.0	180	8.3	7.8	44.0	2.0	10	6.4	0.14
06/25/86	10:00	20.0	214	5.8	8.9	66.0	0.0	10	0.5	0.03
07/22/86	14:30	25.0	202	-	7.4	48.0	3.0	80*	6.0	0.43
08/26/86	14:55	24.0	210	8.5	8.6	-	-	10	0.4	0.03
09/16/86	13:45	19.0	220	8.6	8.5	46.0	0.0	10	1.5	0.02
10/23/86	13:10	14.0	240	11.0	7.8	50.0	4.0	5	1.6	0.06
11/25/86	13:15	6.5	205	11.5	7.7	47.0	5.0	20	1.6	0.17
12/15/86	13:50	4.0	208	14.6	7.6	42.0	5.0	10	1.2	0.28
01/15/87	11:35	6.0	193	13.5	7.5	36.0	4.0	5	0.4	0.15
02/18/87	11:30	3.5	212	10.4	7.1	10.0	18.0	5	0.4	0.06
03/25/87	10:50	9.0	200	13.2	7.4	24.0	14.0	10	2.0	0.12
04/30/87	10:15	13.0	190	11.8	6.7	38.0	12.0	10	6.0	0.17
05/18/87	13:15	21.0	200	9.8	7.3	36.0	10.0	5	6.8	0.18
06/18/87	12:45	24.0	130	9.3	7.6	38.0	5.0	5	0.8	0.09
07/22/87	10:20	28.0	340	8.3	7.5	52.0	8.0	5	6.0	0.18
08/19/87	12:15	25.0	190	8.9	7.4	52.0	10.0	0	3.6	0.14
09/16/87	12:30	23.5	78	8.9	7.1	45.0	20.0	20	11.5	0.27
	MAXIMUM	28.0	340	14.6	8.9	66.0	20.0	80	11.5	0.43
	MINIMUM	3.5	78	5.8	6.7	10.0	0.0	0	0.4	0.02
	AVERAGE	17.0	201	10.2	7.6	42.1	7.5	13	3.3	0.15

DATE	TIME	Total Nitrite as Nitrogen mg/1	Total Nitrate as Nitrogen mg/1	Total Phosphorus mg/1	Total Organic Carbon mg/1	Total Calcium mg/1	Total Magnesium mg/1	Total Chloride mg/1	Total Sulfate mg/1
05/29/86	10:45	0.042	4.40	0.14	7	15.54	7.92	14	16
06/25/86	10:00	0.048	4.15	0.12	4.3	17.36	9.34	14	16
07/22/86	14:30	0.066	3.23	0.33	10	12.81	10.51	14	19
08/26/86	14:55	0.016	3.10	0.10	6	16.84	9.74	14	10
09/16/86	13:45	0.012	3.95	0.09	4.9	16.49	8.02	15	22
10/23/86	13:10	0.010	3.95	0.07	3.9	17.38	8.95	15	33
11/25/86	13:15	0.030	4.15	0.25	7.2	16.10	9.92	14	31
12/15/86	13:50	0.042	5.24	0.19	6	14.45	9.29	13	24
01/15/87	11:35	0.030	5.47	0.10	3	13.49	10.72	12	44
02/18/87	11:30	0.022	5.92	0.07	3.5	14.08	9.77	13	22
03/25/87	10:50	0.030	6.57	0.11	5.4	13.94	8.20	13	17
04/30/87	10:15	0.046	6.33	0.11	5.6	15.52	8.28	13	25
05/18/87	13:15	0.060	5.66	0.07	5.7	17.43	8.08	14	13
06/18/87	12:45	0.026	4.59	0.15	1.1	15.20	8.52	14	15
07/22/87	10:20	0.022	3.52	0.09	5.5	17.21	9.49	18	26
08/19/87	12:15	0.010	2.85	0.08	4.7	17.74	9.11	15	10K
09/16/87	12:30	0.046	2.81	0.23	9.00	12.13	7.91	11	22
	MAXIMUM	0.066	6.57	0.33	10.00	17.74	10.72	18	44
	MINIMUM	0.010	2.81	0.07	1.10	12.13	7.91	11	10K
	AVERAGE	0.033	4.46	0.14	5.46	15.51	9.05	14	21

TABLE A-12 (continued)

MONITORING RESULTS FROM OCTO 8.6, OCTORARO CREEK NEAR ROCK SPRINGS, MARYLAND

DATE	TIME	Total Iron mg/l	Total Manganese mg/l	Total Aluminum mg/l	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
05/29/86	10:45	3.41	0.12	0.26	300*	100
06/25/86	10:00	3.37	0.12	1.02	700*	100
07/22/86	14:30	7.00	0.22	4.02	7900*	4400
08/26/86	14:55	3.38	0.13	0.71	950*	80
09/16/86	13:45	1.82	0.06	0.40	120	20
10/23/86	13:10	1.83	0.07	0.21	180	100
11/25/86	13:15	3.73	0.13	1.35	-	-
12/15/86	13:50	2.37	0.08	0.43	140	80
01/15/87	11:35	2.39	0.07	0.72	60	20
02/18/87	11:30	2.01	0.07	0.17	60	20
03/25/87	10:50	2.54	0.09	0.15K	100	20K
04/30/87	10:15	2.90	0.07	0.43	160	40
05/18/87	13:15	2.63	0.06	0.21	80	20K
06/18/87	12:45	3.02	0.07	0.60	60	20K
07/22/87	10:20	2.51	0.05K	0.18	40	180
08/19/87	12:15	2.39	0.05	0.15K	80	520
09/16/87	12:30	1.80	0.15	1.36	1800*	800
	MAXIMUM	7.00	0.22	4.02	7900	4400
	MINIMUM	1.80	0.05K	0.15K	40	20K
	AVERAGE	2.89	0.09	0.71	796	405

TABLE A-13

MONITORING RESULTS FROM DEER 44.2, DEER CREEK NEAR NORRISVILLE, MARYLAND

DATE	TIME	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/1	pH S.U.	Alkalinity mg/1	Acidity mg/1	Turbidity J.T.U.	Biological Oxygen Demand mg/1	Total Ammonia as Nitrogen mg/1
04/14/86	11:30	-	-	-	7.5	22.0	3.0	0.0	0.8	0.02
05/29/86	14:10	22.0	160	9.6	7.5	38.0	2.0	5.0	3.6	0.12
06/24/86	12:00	21.5	172	6.8	7.6		3.0	10.0	1.5	0.03
07/23/86	10:30	23.0	164		7.5	36.0	3.0	5.0	2.8	0.10
08/27/86	10:30	19.5	190	9.4	7.7	38.0	5.0	5.0	0.4	0.06
09/17/86	11:00	13.5	175	14.5	7.6	36.0	1.5	5.0	0.4	0.12
10/23/86	16:55	12.5	165	10.2	7.6	32.0	4.0	2.0	2.0	0.06
11/25/86	18:00	6.5	180	12.8	7.6	10.0	5.0	0.0	0.8	0.03
12/16/86	11:00	4.0	172	8.6	7.6	26.0	6.0	5.0	0.4K	0.02
01/15/87	13:45	6.5	168	9.3	7.5	25.0	5.0	5.0	0.4	0.02
02/18/87	14:30	4.5	154	12.2	7.2	13.0	11.0	0.0	0.4	0.04
03/25/87	13:55	10.0	155	12.0	7.4	18.0	6.0	0.0	1.5	0.07
04/30/87	13:15	14.0	165	11.8	6.7	26.0	10.0	5.0	4.8	0.14
05/18/87	10:25	17.0	190	10.4	7.4	36.0	8.0	0.0	5.6	0.17
06/18/87	09:15	18.0	170	9.6	7.4	80.0	10.0	5.0	2.0	0.21
07/22/87	12:20	27.0	270	9.3	8.0	41.0	6.0	5.0	10.4	0.32
08/18/87	10:10	21.5	160	8.5	7.1	36.0	8.0	0.0	4.0	0.15
09/16/87	09:00	19.0	69	9.4	7.2	36.0	20.0	5.0	4.8	0.12
	MAXIMUM	27.0	270	14.5	8.0	80.0	20.0	10.0	10.4	0.32
	MINIMUM	4.0	69	6.8	6.7	10.0	1.5	0.0	0.4K	0.02
	AVERAGE	15.3	169	10.3	7.4	32.3	6.5	3.4	2.6	0.10

DATE	TIME	Total Nitrite as Nitrogen mg/1	Total Nitrate as Nitrogen mg/1	Total Phosphorus mg/1	Total Organic Carbon mg/1	Total Calcium mg/1	Total Magnesium mg/1	Total Chloride mg/1	Total Sulfate mg/1
04/14/86	11:30	0.010	5.71	0.07	1.4	11.30	4.49	12	10K
05/29/86	14:10	0.016	5.48	0.06	5.3	13.69	5.19	16	10K
06/24/86	12:00	0.012	5.03	0.06	3.6	13.19	5.19	18	10K
07/23/86	10:30	0.010	4.19	0.07	3.7	15.49	5.58	18	10K
08/27/86	10:30	0.012	4.39	0.03	2.5	14.81	5.53	17	10K
09/17/86	11:00	0.006	6.15	0.04	4.4	14.31	4.96	18	11
10/23/86	16:55	0.004	4.40	0.03	3.1	13.38	4.79	16	18
11/25/86	18:00	0.006	4.17	0.01	2.8	14.68	4.56	19	10K
12/16/86	11:00	0.004	5.50	0.01	2.1	13.65	4.75	19	11
01/15/87	13:45	0.008	4.83	0.02K	1.2	15.21	5.13	19	17
02/18/87	14:30	0.010	5.05	0.03	1.0	11.29	4.61	16	10K
03/25/87	13:55	0.012	5.27	0.03	3.1	11.46	4.84	16	10K
04/30/87	13:15	0.012	5.27	0.06	4.4	11.73	4.90	15	17
05/18/87	10:25	0.016	3.94	0.08	4.5	14.08	5.62	21	10K
06/18/87	09:15	0.014	4.61	0.11	2.4	12.52	4.81	16	10K
07/22/87	12:20	0.016	3.96	0.06	7.6	14.79	5.59	22	10K
08/18/87	10:10	0.010	3.95	0.05	3.2	14.37	5.41	16	10K
09/16/87	09:00	0.004	3.74	0.06	2.50	16.21	5.17	17	28
	MAXIMUM	0.016	6.15	0.11	7.60	16.21	5.62	22	28
	MINIMUM	0.004	3.74	0.01	1.00	11.29	4.49	12	10K
	AVERAGE	0.010	4.76	0.05	3.27	13.68	5.06	17	6

TABLE A-13 (continued)

MONITORING RESULTS FROM DEER 44.2, DEER CREEK NEAR NORRISVILLE, MARYLAND

DATE	TIME	Total Iron mg/1	Total Manganese mg/1	Total Aluminum mg/1	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/14/86	11:30	3.70	0.05	0.15K	20	20
05/29/86	14:10	7.20	0.05K	0.15K	160	20
06/24/86	12:00	3.10	0.05K	0.44	650*	140
07/23/86	10:30	2.87	0.05K	0.21	1400*	500
08/27/86	10:30	2.51	0.06*	0.52	440*	650
09/17/86	11:00	1.93	0.05	0.15	600*	180
10/23/86	16:55	2.44	0.05K	0.15K	80	300
11/25/86	18:00	2.14	0.05K	0.15K	-	-
12/16/86	11:00	2.36	0.05	0.20	120	20
01/15/87	13:45	2.86	0.05K	0.22	320*	620
02/18/87	14:30	2.34	0.05K	0.15K	20K	20K
03/25/87	13:55	2.38	0.05K	0.15	20	20K
04/30/87	13:15	2.69	0.05K	0.15K	100	20
05/18/87	10:25	3.06	0.14*	0.15K	3300*	550
06/18/87	09:15	2.28	0.05	0.46	9600*	620
07/22/87	12:20	2.64	0.05K	0.21	700*	220
08/18/87	10:10	2.45	0.08*	0.28	1300*	1000
09/16/87	09:00	0.31	0.05	0.15K	1700*	850
	MAXIMUM	7.20	0.14	0.52	9600	1000
	MINIMUM	0.31	0.05K	0.15K	20K	20K
	AVERAGE	2.74	0.03	0.16	1206	336

TABLE A-14

MONITORING RESULTS FROM EBAU 1.5, EBAUGHS CREEK NEAR STEWARTSTOWN, PENNSYLVANIA

DATE	TIME	Temperature degrees C	Conductivity umhos/cm	Dissolved Oxygen mg/1	pH S.U.	Alkalinity mg/1	Acidity mg/1	Turbidity J.T.U.	Biological Oxygen Demand mg/1	Total Ammonia as Nitrogen mg/1
04/14/86	09:30	-	-	-	7.7	18.0	4.0	10	1.6	0.05
05/29/86	14:00	20.5	145	14.2	7.4	22.0	2.0	0	7.2	0.16
06/24/86	14:30	19.0	175	6.7	7.8	-	3.0	5	1.0	0.03
07/23/86	12:00	23.0	91	-	7.4	34.0	2.0	5	3.2	0.15
08/27/86	13:00	19.0	135	-	7.7	32.0	4.0	5	0.8	0.05
09/17/86	12:30	13.0	130	8.5	7.5	21.0	2.0	-	0.4	0.02
10/23/86	17:25	13.0	150	10.0	7.3	26.0	-	1	1.6	0.06
11/25/86	16:55	5.5	200	12.6	7.7	32.0	6.0	0	0.8	0.51
12/16/86	13:00	5.5	138	12.8	7.5	19.0	4.0	0	0.4K	0.04
01/15/87	14:10	7.0	143	13.2	7.6	19.0	5.0	0	0.4K	0.14
02/18/87	16:00	5.5	152	9.6	7.3	16.0	14.0	0	0.4K	0.26
03/25/87	14:10	10.0	135	12.2	7.5	12.0	10.0	5	0.5	0.05
04/30/87	12:45	13.5	150	11.2	6.7	22.0	9.0	5	6.4	0.22
05/18/87	10:50	16.0	145	10.4	7.2	22.0	6.0	0	2.8	0.10
06/18/87	10:10	16.0	135	9.8	7.1	20.0	10.0	5	1.0	0.06
07/22/87	12:00	23.0	210	8.9	7.5	32.0	8.0	5	6.0	0.19
08/19/87	11:00	19.0	135	9.1	7.3	28.0	6.0	0	0.8	0.06
09/16/87	09:30	18.0	73	9.3	6.9	32.0	32.0	5	4.0	0.12
	MAXIMUM	23.0	210	14.2	7.8	34.0	32.0	5	7.2	0.51
	MINIMUM	5.5	73	6.7	6.7	12.0	2.0	0	0.4K	0.02
	AVERAGE	14.5	144	10.6	7.4	23.9	7.5	3	2.1	0.13

DATE	TIME	Total Nitrite as Nitrogen mg/1	Total Nitrate as Nitrogen mg/1	Total Phosphorus mg/1	Total Organic Carbon mg/1	Total Calcium mg/1	Total Magnesium mg/1	Total Chloride mg/1	Total Sulfate mg/1
04/14/86	09:30	0.028	6.79	0.11	1.7	9.38	4.23	8	10K
05/29/86	14:00	0.068	6.52	0.10	4.4	10.88	4.84	12	10K
06/24/86	14:30	0.028	6.27	0.11	2.2	11.05	4.96	12	10K
07/23/86	12:00	0.010	5.27	0.10	3.9	14.23	5.14	12	10K
08/27/86	13:00	0.006	6.37	0.08	2.1	11.21	4.73	12	10K
09/17/86	12:30	0.004	5.94	0.09	3.4	10.32	4.33	11	10K
10/23/86	17:25	0.006	6.59	0.09	2.8	10.01	4.19	13	15
11/25/86	16:55	0.060	6.10	0.06	2.7	12.15	4.33	15	13
12/16/86	13:00	0.026	7.01	0.03	1.4	10.61	4.17	14	11
01/15/87	14:10	0.058	5.22	0.03	1.7	12.36	4.59	12	11
02/18/87	16:00	0.054	6.33	0.04	1.0	9.64	4.43	13	10K
03/25/87	14:10	0.014	6.15	0.03	2.7	9.17	4.49	11	10K
04/30/87	12:45	0.058	5.88	0.08	6.7	9.23	4.51	11	17
05/18/87	10:50	0.026	5.47	0.05	2.6	10.50	4.57	12	10K
06/18/87	10:10	0.014	5.71	0.12	1.5	10.27	4.57	11	10K
07/22/87	12:00	0.020	4.84	0.10	5.4	12.37	5.28	15	10K
08/19/87	11:00	0.004	5.28	0.08	2.0	12.00	5.05	11	10K
09/16/87	09:30	0.022	5.28	0.09	1.7	13.56	4.79	13	28
	MAXIMUM	0.068	7.01	0.12	6.7	14.23	5.28	15	28
	MINIMUM	0.004	4.84	0.03	1.0	9.17	4.17	8	10K
	AVERAGE	0.028	5.95	0.08	2.8	11.05	4.62	12	5

TABLE A-14 (continued)

MONITORING RESULTS FROM EBAU 1.5, EBAUGHS CREEK NEAR STEWARTSTOWN, PENNSYLVANIA

DATE	TIME	Total Iron mg/l	Total Manganese mg/l	Total Aluminum mg/l	Fecal Coliform #/100 ml	Fecal Strep #/100 ml
04/14/86	09:30	2.47	0.05	0.15	80	20
05/29/86	14:00	2.91	0.05	0.15	120	180
06/24/86	14:30	2.98	0.05	0.25	220*	300
07/23/86	12:00	2.20	0.05	0.15	140	720
08/27/86	13:00	1.80	0.05	0.22	2500*	400
09/17/86	12:30	1.59	0.05	0.15	40	120
10/23/86	17:25	2.86	0.05K	0.15K	20K	140
11/25/86	16:55	1.75	0.05K	0.15K	-	-
12/16/86	13:00	2.17	0.05K	0.15K	80	20K
01/15/87	14:10	2.96	0.05K	0.28	80	550
02/18/87	16:00	2.52	0.05K	0.15K	20	20K
03/25/87	14:10	2.04	0.05K	0.15K	30	20K
04/30/87	12:45	2.29	0.05K	0.15K	200	20
05/18/87	10:50	2.77	0.05K	0.15K	100	280
06/18/87	10:10	2.44	0.06*	0.28	1200*	800
07/22/87	12:00	2.68	0.05	0.19	340*	340
08/19/87	11:00	2.57	0.08*	0.17	240	550
09/16/87	09:30	0.48	0.11*	0.30	340*	800
	MAXIMUM	2.98	0.11	0.30	2500	800
	MINIMUM	0.48	0.05K	0.15K	20K	20K
	AVERAGE	2.30	0.03	0.13	337	307

APPENDIX B

MACROINVERTEBRATE DATA

SYMBOLS

* - Genera found in kick screens

SUSQ 365.0

MACROINVERTEBRATE DATA
SUSQUEHANNA RIVER AT WINDSOR, NEW YORK
JUNE AND AUGUST, 1987

ORDER	FAMILY	GENUS	1987
Coleoptera	Elmidae	Gonielmis	2
		Macronychus	0*
		Optioservus	18
		Stenelmis	18*
	Gyrinidae	Dineutis	0*
	Psephenidae	Psephenus	37*
Diptera	Athericidae	Atherix	1
	Chironomidae	??	33*
	Tipulidae	Antocha	2
Ephemeroptera	Baetidae	Centroptilum	6*
		Pseudocloeon	7*
	Caenidae	Caenis	3
	Ephemerellidae	Serratella	12*
	Heptageniidae	Heptagenia	20
		Rhithrogena	2*
		Stenocron	0*
		Stenonema	48
	Oligoneuridae	Isonychia	24*
	Potamanthidae	Potamanthus	6*
Megaloptera	Corydalidae	Corydalus	1
	Sialidae	Sialis	1
Plecoptera	Perlidae	Acroneuria	0*
		Phasgonophora	1
	Perlodidae	Isoperla	4
Trichoptera	Hydropsychidae	Cheumatopsyche	5*
		Hydropsyche	31*
		Macronemum	39*
		Symphitopsyche	57*
	Lepidostomatidae	Theliopsyche	15*
	Limnephilidae	Frenesia	1*
	Philopotamidae	Chimarra	29
	Polycentropodidae	Neureclipsis	1
		Nyctiophylax	1
Gastropoda	Physidae	Physa	0*
Tricladida	Planariidae	Dugesia	3*

NUMBER OF TAXA: 35
DENSITY: 142 IPSF
DIVERSITY INDEX: 4.0

SUSQ 340.0

MACROINVERTEBRATE DATA
SUSQUEHANNA RIVER AT KIRKWOOD, NEW YORK

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Optioservus	-	31
		Stenelmis	-	23
		Macronychus	-	8
	Hydrophilidae	Berosus	1	-
	Psephenidae	Psephenus	*	2*
Diptera	Chironomidae	??	3	13
	Tipulidae	Tipula	-	1
Ephemeroptera	Baetidae	Baetis	-	10
	Caenidae	Caenis	-	4
	Ephemerellidae	Serratella	-	4
	Heptageniidae	Heptagenia	1	16
		Stenonema	4	29
	Oligoneuridae	Isonychia	-	4
	Potamanthidae	Potamanthus	*	22*
	Tricorythidae	Tricorythodes	1	-
Lepidoptera	Pyralidae	Petrophila	-	3
Plecoptera	Perlidae	Phasgonophora	-	5
Trichoptera	Brachycentridae	Brachycentrus	-	15*
	Hydropsychidae	Cheumatopsyche	-	9
		Hydropsyche	-	19*
		Macronemum	-	18
		Symphitopsyche	-	11
	Helicopsychidae	Helicopsyche	-	6
	Lepidostomatidae	Theliopsyche	-	3
	Philopotamidae	Chimarra	-	1
Hydracarina	??	??	-	3
Pelecypoda	Sphaeridae	Musculium	*	12*
Tricladida	Planariidae	Dugesia	1	-
Prosopora	Naididae		1	-
	NUMBER OF TAXA:		10	29
	DENSITY (ipsf):		12	90
	DIVERSITY INDEX:		2.5	4.2

SUSQ 289.1

MACROINVERTEBRATE DATA
SUSQUEHANNA RIVER AT SAYRE, PENNSYLVANIA

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Optioservus	*	7
		Stenelmis	11	8
	Psephenidae	Psephenus	1	2
Diptera	Athericidae	Atherix	-	2
	Chironomidae	??	2	145
	Empididae	Hemerodromia	-	1
	Simulidae	Simulium	1	38
Ephemeroptera	Baetidae	Baetis	3	23
		Pseudocloeon	1	49
	Caenidae	Caenis	6	-
	Ephemerellidae	Serratella	1	32
	Heptageniidae	Heptagenia	29	29
		Rhithrogena	-	3
		Stenocron	5	1
		Stenonema	6	25
	Oligoneuridae	Isonychia	2	22
	Polymitarcidae	Ephoron	2	-
	Potamanthidae	Potamanthus	3	25
	Tricorythidae	Tricorythodes	1	1
Lepidoptera	Pyralidae	Petrophila	-	51
Odonata	Coenogrionidae	Argia	-	2
Plecoptera	Leuctridae	Leuctra	*	-
	Perlidae	Phasgonophora	*	1
Trichoptera	Hydropsychidae	Cheumatopsyche	13	13
		Hydropsyche	-	38
		Macronemum	-	11
		Symphitopsyche	6	43
	Hydroptilidae	Ochrotrichia	-	7
Amphipoda	Gammaridae	Gammarus	*	-
Heterodonta	Sphaeridae	Musculium	*	34
Tricladida	Planariidae	Dugesia	-	3
	NUMBER OF TAXA:		22	27
	DENSITY (ipsf):		93	205
	DIVERSITY INDEX:		3.3	3.8

SNAK 2.3

MACROINVERTEBRATE DATA
SNAKE CREEK NEAR BROOKDALE, PENNSYLVANIA

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Macronychus	*	-
		Optioservus	4	2
		Stenelmis	5	3
	Psephenidae	Psephenus	-	2
Diptera	Athericidae	Atherix	-	3
	Chironomidae	??	61	40*
	Tipulidae	Antocha	2	4
		Tipula	-	1
Ephemeroptera	Baetidae	Baetis	*	-
		Centroptilum	-	4*
		Heterocloeon	1	-
	Caenidae	Caenis	2	*
	Ephemerellidae	Serratella	-	4
	Heptageniidae	Epeorus	1	-
		Heptagenia	5	21*
		Stenocron	3	-
		Stenonema	16	51*
	Oligoneuridae	Isonychia	5	17
Megaloptera	Corydalidae	Corydalus	-	2
		Nigronia	-	1
	Sialidae	Sialis	-	6
Odonata	Gomphidae	Ophiogomphus	*	-
Plecoptera	Leuctridae	Leuctra	-	1*
	Perlidae	Acroneuria	-	1*
Trichoptera	Hydropsychidae	Cheumatopsyche	-	19
		Hydropsyche	6	-
		Parapsyche	3	-
		Symphitopsyche	13	36*
	Hydroptilidae	Leucotrichia	-	6
	Philopotamidae	Chimarra	1	2
	Polycentropodidae	Neureclipsis	-	*
	Psychomyiidae	Psychomyia	-	2
Pelecypoda	Sphaeridae	Psidium	-	1*
	NUMBER OF TAXA:		18	25
	DENSITY (ipsf):		128	76
	DIVERSITY INDEX:		2.7	3.4

CAYT 1.7

MACROINVERTEBRATE DATA
CAYUTA CREEK AT WAVERLY, NEW YORK

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Optioservus	-	16*
		Stenelmis	9	12*
	Psephenidae	Psephenus	5	53*
Diptera	Athericidae	Atherix	3	-
	Chironomidae	??	61	44*
	Simulidae	Simulium	2	-
	Tipulidae	Antocha	30	7
		Hexatoma	1	*
Ephemeroptera	Baetidae	Baetis	27	3*
		Centroptilum	-	11*
		Heterocloeon	-	1
		Pseudocloeon	19	5*
	Caenidae	Caenis	16	-
	Ephemerellidae	Serratella	52	13*
	Heptageniidae	Epeorus	8	4
		Heptagenia	16	5*
		Stenocron	-	1
		Stenonema	30	1
	Oligoneuridae	Isonychia	10	-
Megaloptera	Corydalidae	Corydalus	2	-
Plecoptera	Perlidae	Acroneuria	*	-
		Paragnetina	-	2*
	Perlodidae	Cultus	-	1
Trichoptera	Brachycentridae	Brachycentrus	1	-
	Hydropsychidae	Cheumatopsyche	74	1*
		Symphitopsyche	217	30*
	Hydroptilidae	Leucotrichia	3	56
		Stactobiella	6	-
	Philopotamidae	Chimarra	17	-
	Polycentropodidae	Nyctiophylax	1	1
Decapoda	Cambaridae	Orconectes	1	1*
Hydracarina			1	-
Pulmonata	Physidae	Physa	*	-
Tricladida	Planariidae	Dugesia	-	1*
	NUMBER OF TAXA:		27	24
	DENSITY (ipsf):		612	91
	DIVERSITY INDEX:		3.3	3.4

CHEM 12.0

MACROINVERTEBRATE DATA
CHEMUNG RIVER AT CHEMUNG, NEW YORK

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Stenelmis	*	-
	Psephenidae	Ectopria	1	-
		Psephenus	2	-
Diptera	Chironomidae	??	40	15
	Empididae	Hemerodromia	1	-
	Simulidae	Simulium	-	*
Ephemeroptera	Baetidae	Baetis	1	-
		Pseudocloeon	1	-
	Caenidae	Caenis	38	3
	Ephemerellidae	Serratella	*	-
	Ephemeridae	Ephemera	1	-
	Heptageniidae	Heptagenia	22	4
		Stenocron	35	67*
		Stenonema	1	4
	Oligoneuridae	Isonychia	*	-
	Potamanthidae	Potamanthus	-	1*
	Siphlonuridae	Parameletus	2	-
	Tricorythidae	Tricorythodes	11	-
Lepidoptera	Pyralidae	Petrophila	1	-
Megaloptera	Sialidae	Sialis	-	2
Odonata	Coenogrionidae	Argia	4	*
Plecoptera	Perlidae	Acroneuria	-	*
Trichoptera	Helicopsychidae	Helicopsyche	-	1
	Hydropsychidae	Cheumatopsyche	2	-
		Hydropsyche	3	-
		Symphitopsyche	1	-
	Polycentropodidae	Neureclipsis	5	3
		Nyctiophylax	4	-
Decapoda	Cambaridae	Orconectes	1	*
Heterodonta	Sphaeridae	Musculium	9	-
	NUMBER OF TAXA:		25	13
	DENSITY (ipsf):		186	33
	DIVERSITY INDEX:		3.3	1.7

TIOG 10.8

MACROINVERTEBRATE DATA
TIOGA RIVER AT LINDLEY, NEW YORK

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Stenelmis	1	-
	Gyrinidae	Dineutis	1	-
	Hydrophilidae	Berosus	11	-
	Psephenidae	Psephenus	2	*
Diptera	Chironomidae	??	60	44
	Empididae	Hemerodromia	-	2
	Simulidae	Simulium	1	1
	Tipulidae	Antocha	2	3
		Tipula	1	-
Ephemeroptera	Baetidae	Baeits	1	-
		Heterocloeon	2	-
		Pseudocloeon	3	4
	Heptageniidae	Stenocron	-	2
		Stenonema	*	18
	Oligoneuridae	Isonychia	-	5
	Siphlonuridae	Ameletus	-	3
Megaloptera	Corydalidae	Corydalus	-	1*
Odonata	Coenogrionidae	Argia	1	-
Plecoptera	Perlidae	Acroneuria	-	*
		Perlesta	*	-
	Perlodidae	Isoperla	-	*
Trichoptera	Hydropsychidae	Cheumatopsyche	63	38
		Hydropsyche	*	24*
		Symphitopsyche	77	40*
	Hydroptilidae	Agraylea	-	27
		Dibusa	3	-
	Polycentropodidae	Neureclipsis	7	38
		Nyctiophylax	-	1
Amphipoda	Gammaridae	Gammarus	-	1
Oligochaeta	Naididae	??	-	*
	NUMBER OF TAXA:		19	21
	DENSITY (ipsf):		236	84
	DIVERSITY INDEX:		2.4	3.2

SEEL 10.3

MACROINVERTEBRATE DATA
SEELEY CREEK NEAR SEELEY CREEK, NEW YORK

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Optioservus	1	-
		Stenelmis	2	-
	Psephenidae	Psephenus	2	3
Diptera	Athericidae	Atherix	-	4
	Chironomidae	??	153	121
	Empididae	Hemerodromia	-	2
	Tipulidae	Antocha	1	1
		Hexatoma	1	*
		Limonia	1	-
		Tipula	*	1
Ephemeroptera	Baetidae	Centroptilum	6	-
	Caenidae	Caenis	11	16
	Ephemerellidae	Drunella	*	-
		Eurylophella	6	-
		Serratella	1	*
	Ephemeridae	Ephemera	-	1
	Heptageniidae	Heptagenia	6	3
		Stenocron	9	3
		Stenonema	20	3
	Leptophlebiidae	Paraleptophlebia	1	-
	Tricorythidae	Leptohypes	100	5
Megaloptera	Sialidae	Sialis	*	-
Odonata	Gomphidae	Erpetogomphus	1	-
		Stylogomphus	*	1*
Plecoptera	Perlidae	Phasgonophora	1	-
	Perlodidae	Isoperla	-	*
Trichoptera	Brachycentridae	Brachycentrus	-	2
	Hydropsychidae	Cheumatopsyche	1	2
		Hydropsyche	21	2*
		Symphitopsyche	1	4*
	Hydroptilidae	Leucotrichia	1	-
	Polycentropodidae	Neureclipsis	2	-
Pulmonata	Physidae	Physa	*	-
Prosopora	Lumbriculidae	Rhynchelmis	1	-
Planorbidae	Ctenobranchiata	Gyraulus	*	-
	NUMBER OF TAXA:		30	20
	DENSITY (ipsf):		352	58
	DIVERSITY INDEX:		2.5	1.9

SUSQ 44.5

MACROINVERTEBRATE DATA
SUSQUEHANNA RIVER AT COLUMBIA, PENNSYLVANIA

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Dubiraphia	-	5
		Optioservus	3	2
		Stenelmis	7	6
Diptera	Chironomidae	??	174	26
	Empidae	Hemerodromia	3	-
	Simulidae	Simulium	15	-
Ephemeroptera	Baetidae	Baetis	25	-
		Centroptilum	6	-
		Pseudocloeon	96	5
	Caenidae	Caenis	-	43
	Ephemerellidae	Serratella	1	-
	Heptageniidae	Heptagenia	1	48
		Leucrocuta	1	-
		Stenonema	44	73
	Oligoneuridae	Isonychia	152	5
	Polymitarcidae	Ephoron	1	-
	Potamanthidae	Potamanthus	3	114
	Siphlonuridae	Ameletus	1	15
	Tricorythidae	Tricorythodes	-	11
Lepidoptera	Pyralidae	Petrophila	22	3
Megaloptera	Corydalidae	Nigronia	*	-
Odonata	Coenogrionidae	Argia	1	-
Trichoptera	Hydropsychidae	Cheumatopsyche	43	3
		Hydropsyche	172	3
		Macronemum	42	48
		Symphitopsyche	1	-
	Hydroptilidae	Leucotrichia	-	1
	Philopotamidae	Chimarra	-	3
	Polycentropodidae	Nyctiophylax	7	-
Amphipoda	Gammaridae	Gammarus	1	-
Heterdonta	Sphaeridae	Musculium	26	1
Tricladida	Planariidae	Dugesia	4	-
	NUMBER OF TAXA:		27	19
	DENSITY:		852	138
	DIVERSITY INDEX:		3.3	3.1

CNWG 4.4

MACROINVERTEBRATE DATA
CONOWINGO CREEK NEAR PLEASANT GROVE, PENNSYLVANIA

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Macronychus	11	-
		Optioservus	2	6
		Ordobrevia	-	16
		Stenelmis	19	-
	Hydrophilidae	Berosus	*	-
Diptera	Athericidae	Atherix	6	1
	Chironomidae	??	45	8
	Empidae	Hemerodromia	1	-
	Tipulidae	Antocha	52	2
Ephemeroptera	Baetidae	Baetis	33	28
	Caenidae	Caenis	1	1
	Ephemerellidae	Serratella	1	2
	Heptageniidae	Heptagenia	31	29
		Stenocron	1	-
		Stenonema	17	37
	Leptophlebiidae	Paraleptophlebia	1	-
	Oligoneuridae	Isonychia	26	43
	Siphlonuridae	Ameletus	-	1
Megaloptera	Corydalidae	Chauliodes	1	-
		Corydalus	8	5
		Nigronia	3	2
Odonata	Coenogrionidae	Argia	1	-
Plecoptera	Leuctridae	Leuctra	1	-
Trichoptera	Hydropsychidae	Cheumatopsyche	16	1
		Hydropsyche	30	5
		Symphitopsyche	72	25
	Hydroptilidae	Leucotrichia	27	1
		Ochrotrichia	-	1
	Philopotamidae	Chimarra	22	3
Isopoda	Asellidae	Asellus	1	-
	NUMBER OF TAXA:		27	20
	DENSITY (ipsf):		428	72
	DIVERSITY INDEX:		3.8	3.3

OCTO 6.6

MACROINVERTEBRATE DATA
OCTORARO CREEK AT NEW BRIDGE, MARYLAND

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Optioservus	-	1
		Stenelmis	1	-
	Psephenidae	Psephenus	3	-
Diptera	Chironomidae	??	268	37
	Empididae	Hemerodromia	5	-
	Simulidae	Simulium	34	-
	Tipulidae	Antocha	65	8
Ephemeroptera	Baetidae	Baetis	*	11
		Neocloeon	26	-
		Pseudocloeon	32	7
	Heptageniidae	Heptegenia	2	-
		Stenonema	5	10*
	Siphlonuridae	Siphlonurus	1	-
	Tricorythidae	Leptohypes	1	7
Megaloptera	Corydalidae	Corydalus	1	*
Odonata	Coenogrionidae	Argia	-	7
Plecoptera	Perlidae	Acroneuria	*	-
Trichoptera	Brachycentridae	Brachycentrus	819	378
		Micrasema	1	-
	Hydropsychidae	Cheumatopsyche	144	8
		Hydropsyche	44	28
		Macronemum	2	-
		Symphitopsyche	355	35*
	Hydroptilidae	Leucotrichia	2	20
		Stactobiella	1	1
	Philopotamidae	Chimarra	-	7
Amphipoda	Gammaridae	Gammarus	2	1*
Cladocera	Leptodoridae	Leptodora	4	-
Pelecypoda	Corbiculidae	Corbicula	-	*
Prosopora	??	??	*	-
Tricladida	Planariidae	Dugesia	39	-
	NUMBER OF TAXA:		39	18
	DENSITY (ipsf):		27	188
	DIVERSITY INDEX:		2.5	2.0

DEER 44.2

MACROINVERTEBRATE DATA
DEER CREEK NEAR NORRISVILLE, MARYLAND

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Macronychus	3	-
		Optioservus	5	6
		Stenelmis	16	2
	Gyrinidae	Dineutis	2	-
Diptera	Athericidae	Atherix	3	-
	Chironomidae	??	333	7
	Empididae	Hemerodromia	1	-
	Simulidae	Simulium	18	-
	Tipulidae	Antocha	81	2
Ephemeroptera	Baetidae	Baetis	23	1
		Centroptilum	22	-
		Pseudocloeon	95	-
	Caenidae	Caenis	1	2
	Ephemerellidae	Ephemerella	4	-
		Eurylophella	2	-
		Serratella	61	-
	Heptageniidae	Heptagenia	8	1
		Ironodes	8	-
		Stenonema	27	4
	Leptophlebiidae	Paraleptophlebia	1	-
	Oligoneuridae	Isonychia	113	1
	Siphlonuridae	Parameletus	7	-
	Tricorythidae	Tricorythodes	*	1
Lepidoptera	Pyralidae	Petrophila	-	1
Megaloptera	Corydalidae	Corydalus	7	-
		Nigronia	1	-
Plecoptera	Perlidae	Acroneuria	-	1
		Paragnetina	2	-
Trichoptera	Brachycentridae	Brachycentrus	4	1
	Glossosomatidae	Glossosoma	4	-
	Hydropsychidae	Cheumatopsyche	60	-
		Hydropsyche	48	-
		Symphitopsyche	437	1
	Hydroptilidae	Dibusa	-	1
		Leucotrichia	11	-
		Stactobiella	1	-
	Philopotamidae	Chimarra	20	-
Hydracarina			1	-
Prosopora	Lumbriculidae	Rhynchelmis	1	-
	NUMBER OF TAXA:		36	15
	DENSITY (ipsf):		1431	10
	DIVERSITY INDEX:		3.3	3.4

EBAU 1.5

MACROINVERTEBRATE DATA
EBAUGHS CREEK NEAR STEWARTSTOWN, PENNSYLVANIA

ORDER	FAMILY	GENUS	1986	1987
Coleoptera	Elmidae	Optioservus	11	2
		Stenelmis	2	2
	Psephenidae	Psephenus	14	1
Diptera	Athericidae	Atherix	1	-
	Chironomidae	??	134	86
	Empididae	Hemerodromia	2	-
	Simulidae	Simulium	4	1
	Tipulidae	Antocha	39	3
		Tipula	*	-
Ephemeroptera	Baetidae	Baetis	16	16
		Pseudocloeon	61	18
	Caenidae	Caenis	1	1
	Ephemerellidae	Drunella	5	-
		Eurylophella	3	-
		Serratella	19	3
	Ephemeridae	Ephemera	*	-
	Heptageniidae	Epeorus	1	44
		Heptagenia	5	3
		Stenonema	59	32
	Leptophlebiidae	Leptophlebia	5	-
		Paraleptophlebia	-	1
	Oligoneuridae	Isonychia	31	4
	Tricorythidae	Leptohypes	1	-
Megaloptera	Corydalidae	Nigronia	1	1
Odonata	Aeshnidae	Boyeria	*	-
Plecoptera	Leuctridae	Leuctra	2	-
	Perlidae	Phasgonophora	1	-
Trichoptera	Glossosomatidae	Glossosoma	5	5
	Hydropsychidae	Cheumatopsyche	28	2
		Hydropsyche	32	46
		Symphitopsyche	280	92
	Hydroptilidae	Dibusa	1	-
		Leucotrichia	2	-
		Neotrichia	-	1
	Philopotamidae	Chimarra	29	5
	Polycentropodidae	Nyctiophylax	1	-
Decapoda	Cambaridae	??	-	1
Tricladida	Planariidae	Dugesia	3	1
	NUMBER OF TAXA:		35	24
	DENSITY (ipsf):		799	123
	DIVERSITY INDEX:		3.3	3.1

SUSQUEHANNA RIVER BASIN COMMISSION

DEC. 24, 1970

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